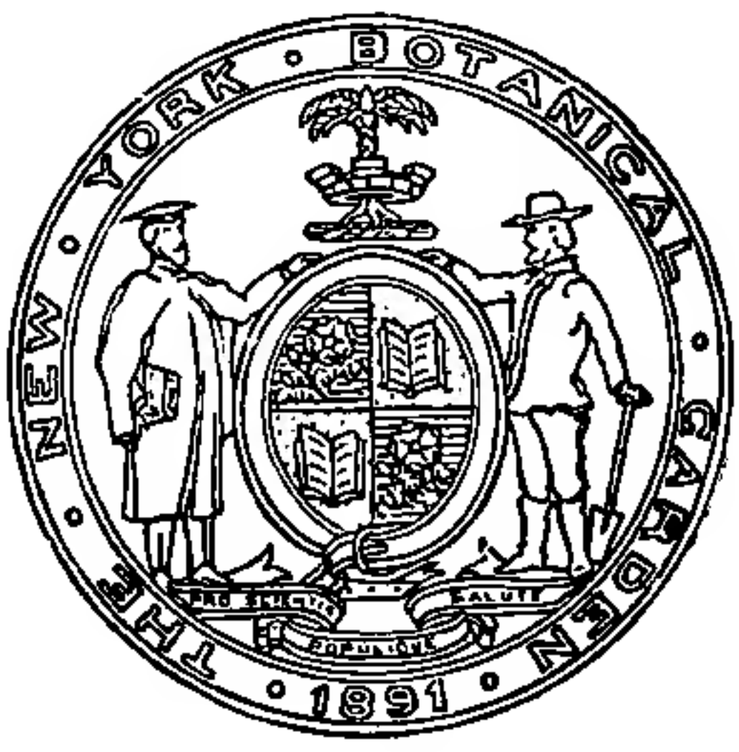
JOURNAL
OF
THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD
EDITOR



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AND NEWS NOTES

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NTS $1.50 A YEAR

A NEW YEAR'S GREETING
SIGNIFYING PROSPERITY
IN THE CHINESE FASHION

JANUARY EVENTS AT THE GARDEN

Courses of Study

Economic Botany — 12 sessions on Mondays — $10
8 p.m., Jan. 3 - Mar. 21, 1949 — Instructor: *Mr. G. L. Wittrock*

Plant Breeding and Selection — 12 sessions on Mondays — $10
9 p.m., Jan. 3 Mar. 21, 1949 — Instructor: *Dr. W. H. Camp*

Cultivation of Greenhouse Plants — 6 sessions on alternate Thursdays — $10
8 10 p.m., Jan. 13 - Mar. 24, 1949 — Instructor: *Mr. Joseph W. Tansey*

Free Saturday Programs

3 p.m. in the Lecture Hall

Jan. 8 ***The Living Earth*** — Four short motion picture films

Jan. 15 ***Your Garden Soil and What It Needs*** — *F. W. Kavanagh*, Associate Curator

Jan. 22 ***The Story of Hudson's River*** — *Mrs. Gordon Wightman*, Hudson River Conservation Society

Jan. 29 ***"First Families" Among the Flowers*** — *H. W. Rickett*, Bibliographer

Members' Day Programs

3 p.m., The New York Genealogical Society, 122 E. 58th St., New York

Jan. 5 ***The Effective Use of Plants in Landscape Architecture and Garden Design*** — *Fletcher Steele*, Landscape Architect

Feb. 2 *Commentaries* — *T. H. Everett*, Horticulturist, New York Botanical Garden
With an exhibition of plants from the Garden's greenhouses

Conservatory Displays

10 a.m. to 4 p.m. daily

During the month of January in the Conservatory there will be a display of cyclamens, primulas, forced bulbs, winter-grown annuals and biennials such as calendulas, snapdragons, wallflowers and stocks.

Museum Exhibits

There will be an exhibit of orchid paintings by Dr. A. Avinoff of New York City, in the Museum Building during January.

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CAROL H. WOODWARD, Editor

VOL. 50 JANUARY 1949 NO. 589

Mark Catesby, Eighteenth Century Naturalist

By William Hubert Miller

MR. MILLER, Assistant Professor of English at Polytechnic Institute of Brooklyn, wrote extensively on the subject of Mark Catesby for *Tyler's Quarterly Historical and Genealogical Magazine* in January 1948. Copies of this are in the Garden's library. The excerpts highlighting the botanical aspects of Catesby's work, which are published on the adjacent pages of this Journal, appear here with the permission of the editor, Mrs. Lyon G. Tyler of Holdcroft, Va.

"SINCE I came here there has been sold the Westover copy of Catesby's *History of Carolina.* It was held near a twelve month at twelve guineas, and at last sold for ten. This seems to fix what should be given for Mr. Bolling's copy, if you can induce him to let me have it, which I am very anxious for."

So wrote Thomas Jefferson to Senator Francis Eppes of Virginia in January 1783. The "History of Carolina" which Jefferson was anxious to obtain was Mark Catesby's "The Natural History of Carolina, Florida, and the Bahama Islands." The book was published in two large folio volumes, with descriptions of the plates given in French and English*; volume one is dated 1731 and volume two 1743. There were many later editions.

Jefferson's knowledge of natural history and his love of gardening are well known. From him came the suggestion that botany be introduced into the curriculum at the University of Virginia. The statesman's letter to Senator Eppes would indicate that he considered Catesby's book a valuable work on the natural history of the southern colonies. But Catesby and his volumes have long since been forgotten except by historians of American natural history and from them he has received but scant attention. Never-

* The library of the New York Botanical Garden has the first edition of this work and also two subsequent editions, one with the title on the cover in French.

theless, both Catesby and his magnificent folios deserve better treatment from posterity.

Interest in the natural history of the colonies among visiting Englishmen and among the colonists was always considerable. Many of the amateur and professional naturalists of the eighteenth century, both in America and in England, knew Catesby personally and most of them were familiar with his work. Catesby visited America for the first time in 1712 when he lived with relatives in Virginia and remained for about seven years with one trip to the island of Jamaica in 1714. During his stay he traveled up the James River to its source, making collections of plants, many of which he carried with him when he returned to England in 1719.

In England William Sherard had seen some of Catesby's accounts of the natural history of Virginia written from that colony. Sherard was wealthy, a professional botanist, and a fellow of the Royal Society; he urged Catesby to return to America to collect material for a book on American natural history, an undertaking, remarks Catesby, "agreeable to my inclinations." Sherard was able to obtain financial backers for the plan and in his recommendation of the expedition he describes Catesby as a gentleman "pretty well skilled in Natural History . . . who designs and paints in water colours to perfection."

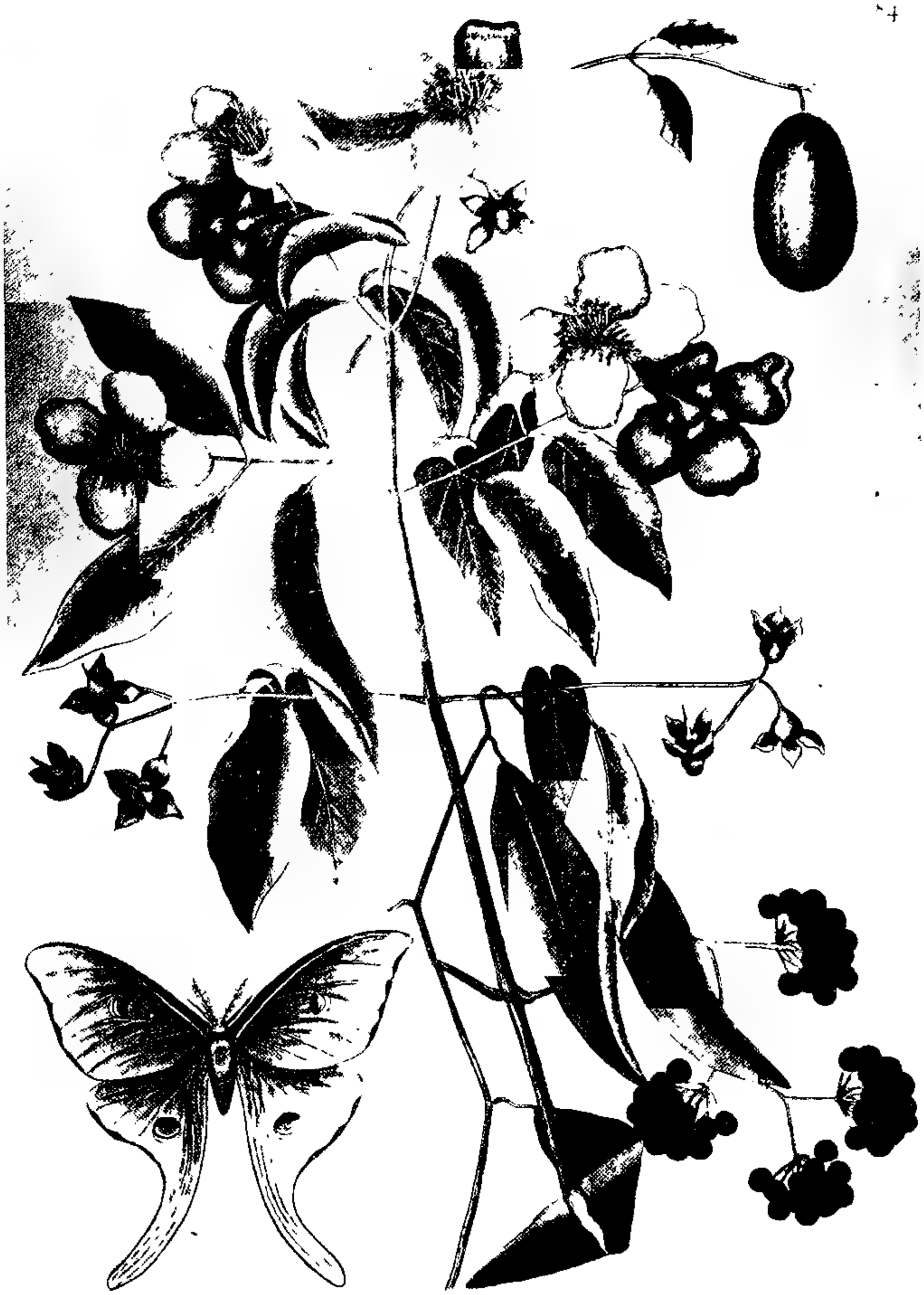
Carolina was chosen for field work because its "productions" were very little known — "except," as Catesby put it, "what was barely related to Commerce, such as Rice, Pitch and Tar." The voyage of more than three months was uneventful, but Catesby missed nothing of interest to a natural historian; he was intrigued by flying fishes and by an owl seen midway across the Atlantic. Charleston was reached in May 1722.

The first year was spent collecting along the coast of Carolina, the inhabited parts of which, Catesby wrote, "extend West from the Sea about Sixty Miles." Later he traveled up the Savannah River, guided by Indians, to Fort Moore where he collected. Several such expeditions into the interior were made. "In these excursions," he writes, "I employed an Indian to carry my Box, in which, besides Paper and Materials for Painting, I put dry Specimens of Plants, Seeds etc., as I gathered

MOCK-ORANGE AND SMILAX
(On the opposite page)

As shown in Plate 84 of Mark Catesby's work

A cocoon of the luna moth pictured at the left hangs in the upper right-hand corner. Catesby's names for these plants are "Philadelphus flore albo majore inodoro" (which is apparently the southeastern shrub *Philadelphus inodorus*) and "Smilax non spinosa, baccis rubris," probably representing *Smilax lanceolata,* one of the red-fruited greenbriers of the South.



MOCK-ORANGE AND SMILAX

(For description see the opposite page.)

them. To the Hospitality and Assistance of these Friendly Indians, I am much indebted, for I not only subsisted on what they shot, but their First Care was to erect a bark hut at the approach of rain to keep me and my Cargo from wet." His objective was to paint all the birds and some of the other fauna of Carolina, Florida, and Georgia.

Dr. Sherard was impatient for botanical specimens and Catesby soon sent the botanist dried plants and seeds which Sherard distributed among interested friends. One cargo destined for Sherard was plundered by pirates and the boat forced to return to Carolina.

When he had made drawings and paintings of what he believed to be most of the birds and reptiles of Carolina, Georgia, and Florida, Catesby sailed for New Providence in the Bahamas. He had been invited to visit the island colony by the Governor of the Bahamas. Catesby visited several of the Bahamian islands, collecting plants, seeds, and marine products, all of which he sent to Sir Hans Sloane and other interested botanists. "The greater number of the Bahamians," Catesby writes, "content themselves with fishing, sticking of turtle, hunting guanas, cutting brasiletto wood, Ilathera bark, and that of wild Cinamon Bark or Winter's Bark." Although earlier in the eighteenth century Bahamians had derived their principal income from the export of brasiletto wood (brazil wood), used in the preparation of red and purple dyes, Catesby tells us that in 1725 large trees were uncommon in the Bahamas, most of them having been exported.

Catesby concentrated on painting the large variety of fishes, many with beautiful and varied colors, to be found in Bahamian waters. But the collection of seeds and plants and the observation of all things relating to natural history were not neglected. He returned to England in 1726, where he devoted the next twenty years of his life to the preparation and publication of his plates and the two folio volumes. From his relatives in Virginia he constantly requested seeds of all kinds and on one occasion he asked for a "ground squirrel."

The publication of the plates and the first folio volume of the "Natural History" brought Catesby more naturalist friends. In America John Bartram, the Philadelphia Quaker naturalist, became a constant cor-

MAHOGANY AND MISTLETOE

(On the opposite page)

This reproduction is from Plate 81 of "The Natural History of Carolina, Florida, and the Bahama Islands," published in the first half of the 18th century. The mahogany (*Swietenia mahagoni*) is native from the southern tip of Florida through the West Indies, and in the northern part of South America. The mistletoe (spelled "misleto" by Catesby) is the common *Phoradendron flavescens* of the region.

MAHOGANY AND MISTLETOE

(For description see the opposite page.)

respondent. Bartram sent plants to England and in return Catesby sent the botanist his sets of plates when they were published. Catesby was especially interested, he told Bartram, in "those plants that are specious in their appearance, or used in physic, or otherwise," and he experimented with growing all the American plants and seeds, with varying results. He found that plants grown in moist soil in America died when planted in similar soil in England; this he believed was due to the lack of sunshine in English summers. Special advice was offered Bartram about shipping dead specimens of American birds; they should be preserved by drying them gradually in an oven and shipped in tobacco dust.

William Sherard had died in 1728, but Catesby found another supporter for his work in Peter Collinson, a wealthy business man, an active fellow of the Royal Society, and a self-made ardent botanist. Collinson was influential in introducing many new plants into England. It was probably through Catesby that Collinson became acquainted with a gentleman in the Bahamas who sent the botanist specimens of the Bahamian flora. Orchid culture began in England in 1732 when Collinson introduced species of orchids collected in the Bahamas.

Catesby tells us about his method of work on the folios in the preface to those volumes. Most birds and reptiles were painted from life, as were the fish when he could obtain enough specimens in order to catch their natural colors, which soon disappear when the fish are out of water. Plants were painted when fresh and first gathered; he is careful to explain that greens vary with the time of the year and with the age of the leaf or plant and hence comparison with a living plant may show difference in color. He apologizes for faults in perspective and suggests that plants illustrated in the flat may serve the purpose of natural history better in any case. He was, he tells us, not "bred a painter," and he was shown how to etch his paintings by a Mr. Joseph Goupy, a professional artist. The plates were tinted under Catesby's personal direction. Illustrations, he felt, were of more value in understanding natural history than verbal descriptions, of which he is sparing. Latin names were supplied by Dr. Sherard, Catesby himself attaching Indian and English names by which the specimens figured were known in America; if no such names existed he named the birds after European birds of the same genus. The birds, of which he figured only the males, he placed on plants which they eat or to which they have some relation. Some characteristic American butterflies, moths, examples of aquatic life, and small land animals are included in the plates.

Jefferson comments in his "Notes on the State of Virginia" that Catesby's birds "are better as to form and attitude than coloring, which is generally too high," and Jefferson himself lists some thirty birds of Virginia not figured by Catesby. The Virginia statesman could speak

with some authority on the birds of the southern colonies, but he was no judge of the brilliant colors of Bahaman fishes which Catesby has caught so well in many of his plates. One of the smaller animals, a rodent which Catesby figures and calls the Bahama coney and describes as having the physical characteristics of both a rat and a rabbit, is not known in the Bahamas today, unless Catesby's "coney" is the guinea-pig-like rodent now found only on one of the tiny Plana Cays in the Bahamas.

Some of Catesby's short descriptions accompanying his plates are graphic and forthright. The flesh of the barracuda, a fish he found common in the Bahamas, he reports, "has a very rank and disagreeable savour both to the nose and the palate, and is frequently poisonous, causing great sickness, vomiting, and intolerable pain in the head, with loss of hair and nails; yet the hungry Bahamians frequently repast on their unwholesome carcasses." Of the Carolina parrot he tells us "Their guts is certain and speedy poison to cats."

"The Natural History" enjoyed a considerable reputation among naturalists, both amateur and professional, throughout the eighteenth century. Linnaeus based some of his species on Catesby's plates and Buffon often quotes from Catesby's History in his own monumental "Histoire Naturelle Des Oiseaux" when discussing the birds of the southern colonies and the Bahamas, on which Catesby was accepted as an authority.

Catesby's collections are at Oxford and the British Museum. Gronovius named a Bahamian plant *Catesbaea.* Only two of these plants were discovered by Catesby on New Providence, but he sent seeds to England where they were successfully cultivated. This is one of the many New World plants introduced into England by Catesby. Among others was the catalpa, which was unknown to the white inhabitants of Carolina until Catesby discovered the trees in the interior; he remarks that the people of Carolina are "little curious in Gardening, yet the uncommon beauty of the Tree has induced them to propagate it."

Only a passion for natural history could have made possible the completion of the two hundred and twenty plates in the Natural History. To depict as accurately as he could with pencil and brush the flora and fauna of Carolina, Florida, and the Bahamas became the exciting and faithful occupation of more than twenty years of Catesby's life. He was destined to live but one year after the publication in 1748 of an appendix of twenty plates. No better figures of the birds and plants of America were published until Audubon's famous plates appeared a hundred years later. Catesby's pigments, in the first and second editions of the folios, have remained as fresh as the day they were applied and the draftsmanship is on the whole accurate and well executed, though often lacking the perspective of the Audubon plates. The folios remain, however, as Bartram himself put it to Catesby, "an ornament for the finest library in the World."

Flower Compositions For The Home In Eastern Asia

I. The Chinese Manner of Flower Arrangement

By Ervin S. Ferry

"I ever haunt the garden in the spring
From smiling flowers to learn their whispered lore."
Wang Wei.

GENERATIONS of Chinese artists have contemplated the diverse moods of nature, have tried to subject themselves to its inspiration and have striven to express in poetry and painting their own emotions as well as the intrinsic nature of the scene. This attitude is carried over into the arrangement of flowers, as it is practised with living plant material and also as it is depicted in ink and watercolor. The artists of China have personified the spirit of flowers and have given it the name of Hua Hsien, Taoist goddess of flowers. The twelfth day of the eighth month has been set aside for a flower festival in her honor.

Although in ancient Chinese literature many references are made to the proper manner of arranging flowers for temple offerings and for home decoration, no adequate treatment has appeared in any language. The principal sources of our information on the bases of flower arrangement as practised in China during ancient times are picture rolls and wood-block prints.

Toward the end of the fifth century a Chinese painter, art critic and writer named Hsieh Ho announced a group of principles which he considered to be the essential components of a design and which should therefore form the basis of painting. These essential components, usually called the Six Canons of Hsieh Ho, are still accepted by Chinese artists as the foundation of painting. They are:

About the Author

The certificate DAI NIPPON KWATOKU was awarded Mr. Ferry in a ceremony at the Rokkaku temple in Kyoto by the chief priest and head of the Ikenobo school (the system of principles, methods and techniques of the Ikenobo masters) of flower arrangement. In a ceremony at the Daikakuji temple the chief priest awarded the certificate KAIDEN of the Saga-Onryu together with the certificate SHIHAN of the Misho-Onryu. The certificate KOKUKAI TO was granted by the head of the Sensei school of flower arrangement.

Mr. Ferry is an honorary member of the Japanese Flower Artists Association and a contributor to *Kwado*, journal of the Ikenobo school of flower arrangement.

For other articles by Mr. Ferry, see "Japanese Art of Arranging Flowers for the Home" and "The Making of a Flower Master" in the Journal of the New York Botanical Garden for April and October, 1939.

1— ***Rhythmic Vitality.*** This represents the life movement of the spirit through the rhythm of things. Rhythmic vitality involves simplified form, significant lines, harmony, and adherence to nature.

2— ***Organic Structure.*** The creative spirit incarnates itself in pictorial conception and thereby takes on the organic structure of life. The fundamental structure of a composition should be emphasized. A picture lacking the appearance of organic structure sometimes is said to be "without bones." (In Chinese painting, lines which are continuous and strong from beginning to end are called "bones.")

CHINESE LOVE OF FLOWERS ILLUSTRATED EARLY

The arrangement in a broad basket, shown at the left, was found in a book dating probably from the 16th century.

"Domestic Peace" is the title of the picture on the right, also taken from an ancient book. It shows a Chinese mother teaching her small boy how to write — a daily lesson in the homes of Chinese people. The inscription on the wall, translated, says:

"If without the teaching from mother today
How can there be the fragrant name tomorrow?
Honlims* and scholars are selected from within the books.
Ambitious boys ought to go forward in tireless energy."

The vase on the left containing carefully placed flowers is characteristic of scenes of Chinese home life.

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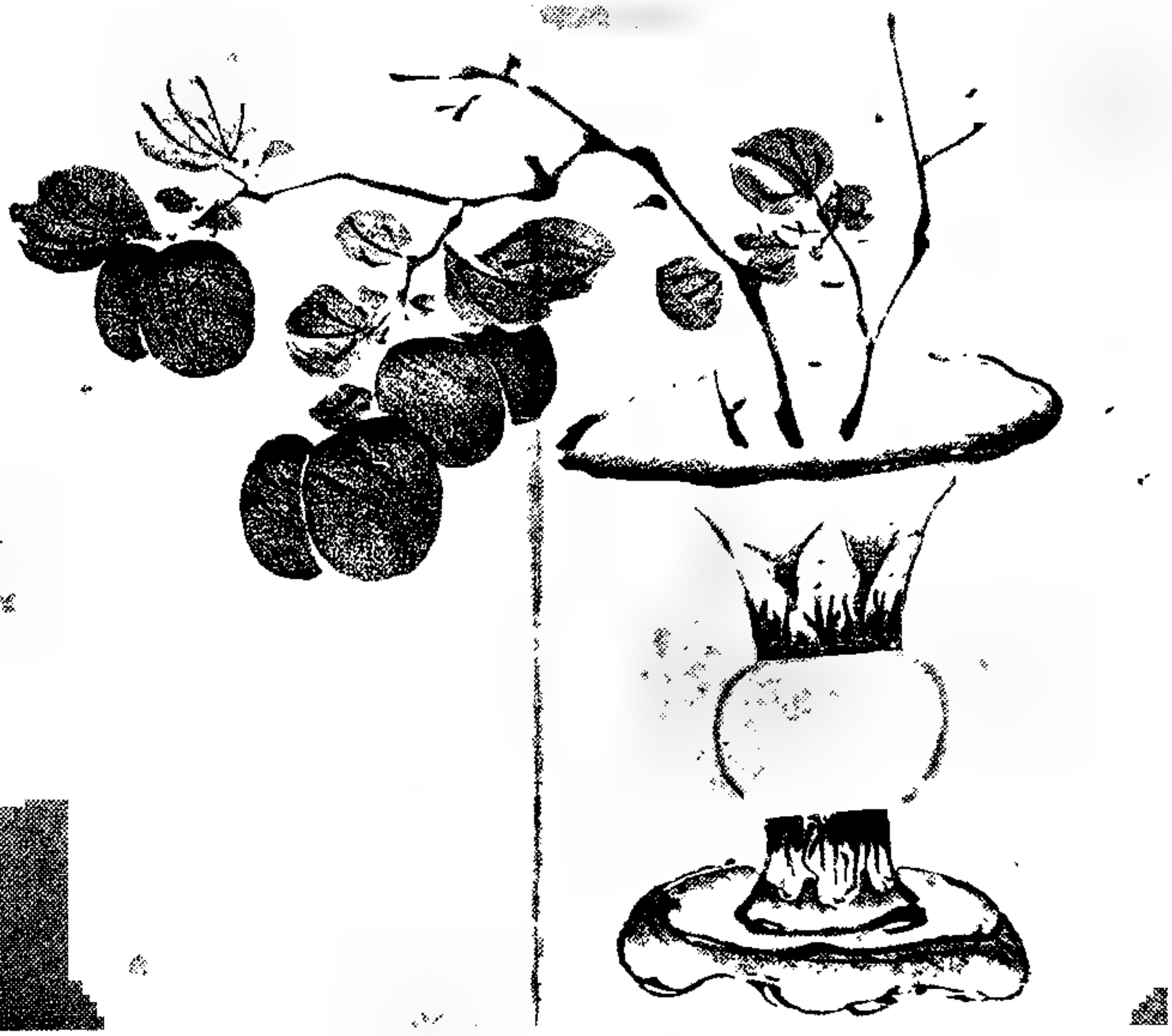
*Persons who have passed a high state examination.



MODEL FROM AN EARLY BOOK

The curve most frequently used in Chinese flower arrangement is illustrated in this example from "The Flower Register of the Ten Bamboo Studio" (Shih-chu chai hua-p'u) of 1627. This early copy book of painting for beginners is still in existence today.

3— ***Conformity with Nature.*** The essential character of each element should be exhibited and all superfluous details avoided.

4— ***Appropriate Coloring.*** The color of each object should be true to nature and the colors of the various parts should be in harmony with one another and with the surroundings.

5— ***Placing and Composition.*** The composition should be correctly conceived and executed. Each object should be carefully placed, to insure rhythm, aesthetic balance, and unity.

6— ***Style.*** The style of a composition should conform with the emotions the composer strives to arouse in the viewer or the particular idea he wishes to induce. There are many ancient albums of classical compositions by eminent masters which are studied to this day.

A painting in the classic Chinese manner is a line composition often dominated by one line which on account of its dignity and position constitutes the principal radical element. This line will be accompanied by

a group of subordinate lines that serve to enrich the beauty of the radical line as well as to complete the design. The arrangement of flowers, as practised by the Chinese, follows the same principles.

In a flower composition each branch or flower stalk is a line element of the composition. The simplest design consists of a single radical element accompanied by a small number of accessory elements. A favorite design has two radical elements, exhibiting the Confucian ideal — symmetry born of dualism and subordination of the parts to the whole.

An isolated flower composition may be the subject of a wood-block print to be presented as a greeting to a friend or as a token on the occasion of a festival or a holiday. When a flower composition is depicted on a Chinese hanging scroll, however, it is generally an accessory detail and not the object of principal importance in the mind of the artist.

The reproductions of artists' sketches, shown on pages 12 and 13, illustrate the following principles on which, according to evidence offered in early literature, wood-block prints and scrolls, the ancient Chinese painters based their flower compositions.

1 — All plant material should appear alive and growing as in its natural environment.

2 — All branches and flower stalks of interesting shapes are highly esteemed. In some cases they may be caused to assume desired shapes while growing, but little manipulation of plant material after it has been separated from the parent stem is practised.

3 — The elements should not be closer together than they might be while growing.

4 — When mounted in a basin-shaped container the principal radical element rises at one side of the center.

5 — The water surface in the container represents the earth. No part of the plant material below the water surface should be visible.

6 — Accessories accompanying flowers or branches should have a definite reason for being introduced into the composition. They should be used only if they suggest an idea or increase the rhythm and unity of the composition.

Natural unwrought stones frequently are employed to suggest abstractions. A rounded stone may suggest peace; a tall stone more massive at the base than at the top may suggest constancy and stability of character; one that is well balanced but that is wider at the top than at the base may suggest dynamic force of character. A gourd is one of the attributes of a god of longevity and may be used as an accessory in a composition designed to express the wish that the recipient may enjoy a long life.

Large gourds often are used to hold food. A small half gourd makes a convenient spoon or ladle. There is a Chinese saying, "With half a gourd I am content." That is: "Poverty does not disturb me," or "A half loaf is better than no bread." Such a gourd spoon placed as an accessory in a composition of appropriate flowers is a poetic expression of this familiar saying.

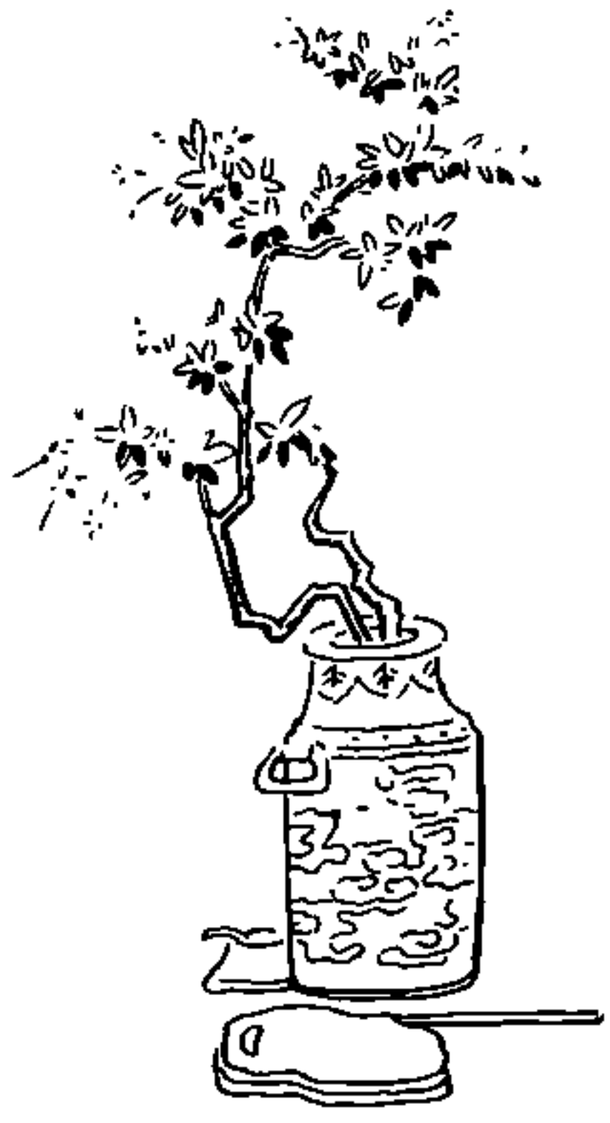
MODERN CHINESE COMPOSITIONS FOLLOWING ANCIENT RULES

These illustrations, recently made by a Chinese artist, illustrate the six principles of flower composition used by ancient Chinese painters and still in use for flower arrangements, both in art and in reality in the present day.

The ancient Chinese Literary School of Landscape Painting insisted that, in a painting, thought is more important than the accurate delineation of natural objects. For admission in the Imperial College of Painters, Emperor Hui Tsung (A.D. 1082-1135) of the T'ang dynasty required that the competitive painting submitted by each aspirant should exhibit subtlety of thought as well as artistic execution. Chinese painters in the classic style still strive to suggest spiritual qualities rather than produce meticulous realism.

Definite ideas and emotions may be suggested by the attitudes of lines and the shapes of objects and spaces. Upright lines express dignity and strength. Upward-directed branches suggest youth and aspiration. Horizontal lines suggest rest. Oblique lines suggest action and dynamic force. Curved lines suggest grace and movement.

A plant distinguished by a conspicuous characteristic may become a symbol of an abstract idea. Young branches of vigorous growth in a flower composition may suggest the virility of youth as well as a hope of increase of strength. A branch of old pine is often used to suggest the majesty of a wise man growing old gracefully. A flower growing from a bulb of many layers suggests "Many Good Things," especially "Many Happy Years." Since the plum tree sends forth blossoms before there are any leaves, even while the branches and ground are flecked with snow, a flowering plum branch is an emblem of "Strength that Overcomes Difficulties," or "The Constancy of an Ideal Friend."



FILIAL DEVOTION, FROM AN ANCIENT MYTH

The composition in the center is based on the story of the dutiful son who tried to do the impossible task of securing edible bamboo shoots for his sick mother when the ground was frozen. Finding the shoots below ground woody and inedible he wept so copiously that the ground thawed and the shoots which he sought became soft and edible.

The arrangements at the left and right carry out the same six rules illustrated on page 12.

FOUR ARRANGEMENTS IN THE CHINESE MANNER, USING CHINESE CONTAINERS AND ACCESSORIES

The stone used at the upper left designates constancy; that at the lower right, dynamic force. The curve of the chrysanthemums in the vase at the upper right duplicates the curve in the illustration taken from the 17th century copy book for painters (page 10). The arrangement at the lower left is placed in a Chinese dustpan.

Through some well known historical event, tradition, myth, folk tale or popular poem, a plant or flower may become a symbol of a person, personification, maxim, or moral attribute. For example, a popular Chinese myth relates that while a poor widow of the province of Fukien was hard at work and bemoaning the idleness of her son, a weary beggar came to the door and said, "Kind woman, would you spare a few grains of rice to a weak old man who has eaten nothing for two days?" "I am very sorry," replied the woman. "There is no food in the house except a half bowl of rice for my son when he returns. I do not know where the next bowl of rice will come from." The look of despair on the beggar's face so touched the heart of the poor woman that she called back the old man and gave him the rice. As soon as he had finished, he heartily thanked the benevolent woman, stopped a moment in front of the house, spat a few grains of rice on the ground and disappeared. The next morning, the woman's astonished eyes beheld scores of graceful plants with white petals and yellow centers growing where the beggar had stopped. The sale of beautiful plants from this stock made the woman prosperous and the Fukien province famous. To this day this so-called Chinese Sacred Lily is widely used during the New Year season as a symbol of wishes that the recipient may be blessed with prosperity throughout the year. The Chinese Sacred Lily is the Narcissus of Greek mythology, and for occidentals has become an emblem of devotion.

Many flowers and trees have evoked in sensitive minds ideas and emotions which have been expressed in beautiful verse. In the popular mind such flowers and trees will be associated with an abstract idea which may be suggested to a viewer of the plant. The same plant may suggest different ideas depending upon the arrangement, the accompanying plant material, and accessories, as well as upon the familiarity of the viewer with literary allusions. With different conditions the chrysanthemum may express dignity, nobility, constancy, or fellowship.

In the much quoted verse:

"The peach to the plum tree
Speaketh not, yet below them
A path spontaneously is formed,"

a Chinese poet has aptly expressed the thought: Without effort on their part, persons of attractive natures are brought together naturally. To a viewer familiar with this verse, a composition combining flowering peach and plum branches may suggest brotherliness and cordial relationship.

On the Cover

The flower arrangement made in a Ming vase by Mr. Ferry for the cover of this month's Journal is a New Year's greeting in the Chinese style, the narcissi, in accord with ancient Chinese legend, signifying prosperity.

Annual Chrysanthemum Show

Program and Three-Day Exhibition Staged at Botanical Garden

JAMES Stuart, Honorary Chairman of the fourth annual Chrysanthemum Show at the New York Botanical Garden, Oct. 22-24, was given special honor in the naming of a new chrysanthemum at the opening of the program in the lecture hall the first day of the event. Kept away by illness, he was represented by Mrs. H. E. Kincaid of Mamaroneck, who received the bronze chrysanthemum "James Stuart," a creation of the Michigan grower, V. de Petris, from the hands of Ernest L. Bertram, President of the National Chrysanthemum Society. Mr. Stuart, who has been head gardener of the Constable estate in Mamaroneck for more than 40 years, has long been active in flower shows in and around New York, and since 1946 he has taken part in the indoor chrysanthemum shows at the New York Botanical Garden.

The program which followed the naming of the new chrysanthemum consisted of a talk by Mr. Bertram and a demonstration of flower arranging with chrysanthemums by Mrs. Loren R. Dodson of Mamaroneck. Tea was served in the Members' Room at the close of the afternoon.

Saturday was featured by a children's competitive exhibit in the basement of the Museum Building. More than 7,500 visitors came to the show the first two days, but rainy weather on Sunday reduced the attendance to a three-day total of 10,000.

Principal awards in the show, which was the fifth for the National Chrysanthemum Society, went to Mrs. Blanche Kullgren of Palisades Park, N. J., who won the Scott cup for outstanding cultural achievement as exhibited in a single bloom; to the North Jersey chapter of the National Chrysanthemum Society, which won the Max Schling silver medal for a display covering 25 square feet; to Dr. Ernest L. Scott, who won the Max Schling bronze medal for a display of the new chrysanthemum "Mary MacArthur;" and to Mrs. G. W. Davis of Brooklyn, who took first place in the invitation class of flower arrangements under the title of "Spirit of the Orient." Mrs. Dunham C. Jones of Brooklyn won second and Mrs. William Stickles of Malba, L. I., third place for their oriental compositions. Mrs. Frank Rathborne was awarded first place for her arrangement of chrysanthemums for a church altar. More than 150 other awards were made for displays of chrysanthemums, all of which were grown by amateurs. In addition, Bobbink & Atkins won a special award for a display of new varieties.

Flying from California to attend the show, Lucius Bates of Sacramento joined with Mr. Bertram and with Charles L. Tyrrell of West Englewood, N. J., President-elect of the National Chrysanthemum Society, in opening the doors to the public. At the annual meeting later in the day, Mr. Bates was elected Vice-President and Harry Krimmel of Westminster Choir College, Princeton, N. J., Treasurer. Carl Toepler of Teaneck, N. J., was continued as Secretary and Dr. Ernest L. Scott as Editor.

Among the many persons who contributed to the success of the show were Mrs. Clifford B. Curtis, who served as general chairman; James S. Jack as chairman of staging; Mrs. J. J. Kirchhof, who supervised the staging of the gardens; James G. Esson, who headed the judges for the horticultural displays, and Mrs. Robert Kearfott, chairman of judges for flower arrangements.

THREE PRIZE-WINNERS AT THE CHRYSANTHEMUM SHOW

The Max Schling silver medal went to the Northern New Jersey chapter of the National Chrysanthemum Society, of which Dr. Ernest L. Scott is president, for the garden shown above. Among the invitation flower arrangements with the title "Spirit of the Orient," Mrs. G. W. Davis of Brooklyn won first award with the composition at the left, and Mrs. Dunham C. Jones, also of Brooklyn, second, with the arrangement at the right.

NOTICES AND REVIEWS OF RECENT BOOKS

Aquatic Plants—and Fish To Complement Them

GOLDFISH VARIETIES AND WATER GARDENS. William T. Innes. 381 pages, illustrated. Innes Publishing Company, Philadelphia, 1947. $5.

This book, in addition to its value on other counts, should serve the purpose of making the fish fancier and the plant enthusiast more respectful towards each other's hobby. Actually, fish and plants are largely complementary—the plants utilize the waste products given off by the fish, while submerged aquatics benefit the fish by oxygenating the water.

What I know about fish you could put in your eye without injury, so I shall skim over this part of the book as lightly as a dragon-fly; merely saying that, so far as an almost completely uninitiated layman can tell, Mr. Innes has covered his subject competently and exhaustively in a way that is likely to create interest even in those who have no piscatorial predilections.

About half of the book is devoted to aquatic plants, aquarium construction and appliances; together with water gardens and the making of outdoor pools.

Forty or so species and varieties of plants suited to aquarium culture are described. These, I suppose, represent all the available plants adapted for this purpose. The line drawings and photographs which accompany most of the descriptions make the plants easily recognizable. This is important, especially for those who find it more convenient to buy their plants from pet stores, where the vendor may lump all kinds together under the generic term "grass."

I was interested to learn that moneywort (*Lysimachia nummularia*), a "land" plant, will thrive as a partially submerged aquatic. It reminds me of the time when I saw several pans of *Fittonia Verschaffeltii* placed under water in the pool below the orchid bench in Brooklyn's Prospect Park. I cannot conceive that this species could thrive permanently in such a location, but the plants looked healthy enough, and I was assured they had been growing there for six or eight weeks.

The chapter on Water Gardens includes directions for the construction of pools and receptacles, with the planting and care of waterlilies and other pond and waterside plants. Mr. Innes rightly mentions that, while many waterlilies can adapt themselves to restricted surroundings, flowers of maximum size cannot be expected, if the optimum environment—sun, rich soil, and plenty of room—is not provided.

The Selected List of Available Waterlilies appealed especially to me. This, I think, must include practically all of the worth-while species and varieties, thoroughly described, with many of them illustrated by excellent photographs. A surprisingly large number of these are in color. This section is of immense value, both to the beginner and the expert, more especially as commercial sources of supply are indicated for each variety.

The latter part of the book contains pictures and descriptions of pools and water gardens. All of these, with two exceptions, show admirable taste and anyone contemplating making and planting a water garden should get valuable ideas from studying them.

There are a few slips in botanical terminology, but these are of no importance compared with the value of the book as a whole. Mr. Innes is to be congratulated—especially on the excellence of the illustrations, which are skillfully reproduced.

MONTAGUE FREE,
Staff Horticulturist,
The Home Garden.

Reports From Tree Men

23rd NATIONAL SHADE TREE CONFERENCE. Proceedings edited by Paul E. Tilford. 414 pages. Collier Printing Co., Wooster, Ohio. 1948.

In the field of shade tree maintenance, no publication is more important to the commercial arborist, shade tree warden and park superintendent than the annual proceedings of the National Shade Tree

Conference. This edition, by far the largest in the history of the conference, contains outstanding professional and scientific papers on all phases of shade tree care. Every arboriculturist will profit greatly by reading the twenty-third proceedings, as well as those of the Fourteenth Western Shade Tree Conference which are incorporated in the 414-page volume.

P. P. PIRONE,
Rutgers University.

Text for Future Farmers

GRAIN CROPS. Harold K. Wilson. 384 pages, illustrated, indexed. McGraw-Hill, New York, 1948. $4.

This text is developed in a straightforward and logical manner from well selected material. Tabular matter and charts are suitably chosen and to the point. The first chapter deals with the significance of plants to life in general, the essentials of plant growth, and how growth is affected by environmental factors. The chapters which follow deal with plant classification, crop distribution, rotations, marketing, and crop improvement. All crops harvested for grain are discussed.

The treatment is short on general adaptation, especially for the East and South where more information is desirable on the amount and placement of fertilizer. The book could be used to good advantage in the grain crops portion of a general agronomy course or by students of vocational agriculture.

J. C. ANDERSON,
Rutgers University.

Toward Greater Productivity

USING AND MANAGING SOILS. A. F. Gustafson. 420 pages, illustrated, indexed. McGraw-Hill, New York, 1948. $2.80.

In fifteen well written chapters, this book discusses most of the practical problems that will be met with in the actual management and use of soils. Evaluating the soil, selecting farm and home sites, soil erosion, and the proper use of lime, fertilizers, and animal manures are among the subjects treated in detail. Dr. Gustafson has drawn generously upon his long experience in soils work to acquaint the reader with the necessity for protecting the soil and conserving its productivity through proper management.

The book is excellently illustrated, many of the pictures carrying a point more effectively than could words. A wealth of information is included in the appendix, which contains a section giving the basic chemical facts required for an understanding of soils, fertilizers, and crops. "Using and Managing Soils" is written primarily for the farmer, but will provide interesting reading for all who desire to become better acquainted with the soil.

E. R. PURVIS,
Rutgers University.

Chemical Control for Crops, Weeds and Ornamentals

GROWTH REGULATORS FOR GARDEN, FIELD AND ORCHARD. John W. Mitchell & Paul C. Marth. 129 pages, illustrated, indexed. Chicago: The University of Chicago Press; London: Cambridge University Press; Toronto: W. J. Gager & Co., Ltd., 1947. $2.50.

A short handbook for the use of the "homeowner, amateur gardener, farmer, professional horticulturist, or agricultural adviser" in the "lawn, garden, field, or orchard," this is a simply written non-technical exposition of the value and use of growth-regulating substances. The reader will find scientifically accurate statements of the use of these chemicals. Among the subjects treated are: Weed control; Vegetative propagation; Prevention of fruit drop; Ripening fruit; Prevention of growth in storage.

ARTHUR J. EAMES,
Cornell University.

Chemicals for Insect Control

CHEMICAL INSECT ATTRACTANTS AND REPELLENTS. Vincent G. Dethier. 289 pages, illustrated, indexed. Blakiston, Philadelphia, 1947. $5.50.

The book presents a compilation of scientific findings on repellents and attractants, and should prove of great interest to entomologists, insecticide chemists, and others. The subject is covered in ten chapters, followed by extensive bibliographies. Interesting discussions are given on the following: Thermostimuli, photostimuli, mechanostimuli; Nature of chemical attractants; Essential oils, resins, and related substances; Fermentation products; Protein and fat decomposition products; Olfactometers and threshold concentrations; Baits and

traps; Repellents; Chemical basis of taste and olfaction; and Evolution of feeding preferences.

The author is Professor of Zoology and Entomology at Ohio State University and was formerly Entomologist for the Inter-Allied Malaria Control Commission.

J. M. GINSBURG,
Rutgers University.

Vegetables Planted in Combination

HOECHSTERTRAEGE DURCH MISCHKULTUR WAHLVERWANDTER GEMUESEARTEN. A. G. Wirth. 119 pages, illustrated. Verlag Eugen Ulmer, Stuttgart, Germany, 1946. RM 2.

The newest fad for growers of vegetables in Holland and Germany is "Mischkultur" or "mixed culture" — which means that instead of growing only beans, for example, in one bed, the beans are alternated with another crop, such as Savoy cabbage.

Various claims are made for this method of gardening; some combinations are said to benefit the roots, others (such as carrots and leeks together) are said to keep away the pests of both plants. Illustrations show plants happy in certain combinations, shedding tears of misery in others. Charts and lists are given, with cultural directions, to help the home gardener select the most beneficial combinations.

It is obvious that when plants of contrasting stature, both above and below ground, are grown together, closer planting can be accomplished and something approaching a double crop harvested. The other advantages of the system, however, would seem to need scientific testing outside of the region of origin, though it is said that the method has been proved successful by more than one generation of truck gardeners in the vegetable growing districts of Holland and Germany.

CAROL H. WOODWARD.

Dominican Mixture

SAMBUMBIA. Page Cooper. 203 pages. The Caribbean Library, New York, 1947. $2.75.

It is difficult for a visitor, even though a trained newspaper writer, to catch the spirit of a foreign country and its people, during a short visit. It was surprising to find that Page Cooper had succeeded in capturing the appeal the Dominican Republic has for its visitors in her book. I only regret that she did not get off the usual tourist trail and catch more of the folk lore and native wisdom of the Dominican people.

Sambumbia is a rich stew prepared in the Cibao valley of the Dominican Republic, probably the richest agricultural area of the Caribbean. The book is truly sambumbia, a rich mixture of history, local personalities, sport, politics and even a few prophecies for the future of that country. "Sambumbia" is delightful reading with pleasant reminiscences for anyone who has been to the Dominican Republic and a romantic introduction to the country and the people for one who may travel there in the future.

R. A. HOWARD.

New Editions

COMMERCIAL FLOWER FORCING. Alex Laurie & D. C. Kiplinger. 550 pages, illustrated, indexed. The Blakiston Co., Philadelphia, Fifth Edition, 1948. $4.75.

It is a rare triennial in which a new edition of "Commercial Flower Forcing"

SEEDS OF RARE PLANTS

THE PIONEER SEED CO., Dimondale 9, Mich., U.S.A., wish to obtain seed of any rare plants, either by exchange or purchase. Write for a copy of their monthly catalog of Rare Flower Seeds.

by Laurie & Kiplinger does not appear. This is the fifth. The fourth was reviewed in the Journal for July 1945 and the authors have continued in their attempt to keep the book thoroughly up to date.

NEW DESIGNS OF SMALL PROPERTIES. M. E. Bottomly. 174 pages, illustrated. Macmillan, New York, 1948. $3.75.

With a slight change in title, this is essentially a new edition of a book first issued in 1926. New trends in landscaping design, reflecting changes in architecture have been featured. Sketches and plans of houses and grounds form a large part of the book.

Technical Papers

A REVIEW OF THE GENUS DENDROBIUM (ORCHIDACEAE) IN AUSTRALIA. H. M. R. Rupp and Trevor E. Hunt. Proceedings of the Linnean Society of New South Wales, Vol. 72, Parts 5-6, Pages 233-251. Jan. 1948.

Of the thousand or more species of *Dendrobium* known, the authors claim only 49 for Australia, deleting all uncertain ones and those which have not been recorded since they were first described. There are six text figures. The senior author wrote "Something About Australian Orchids" for the Botanical Garden's Journal in 1946.

A TAXONOMIC STUDY ON THE GRASSES OF PENNSYLVANIA. Richard W. Pohl. Reprinted from *The American Midland Naturalist*, University of Notre Dame, Indiana, Vol. 38, Part 3, Pages 513-604, indexed. Nov. 1947.

The 77 genera and 233 species which are considered in this monograph include *Zea Mays* which, the author reports, occasionally escapes from scattered seed along roadsides, though it does not persist. There are keys and brief descriptions of the species and a map of climatic zones in the state.

DIE BERBERIS DER SECTION WALLICHIANAE. Camillo Schneider. Mitteilungen der Deutschen Dendrologischen Gesellschaft. Nr. 55, 1942. 60 pages, illustrated.

All 71 species of *Berberis* that are included here are native in Asia, and two maps show their distribution there. At the end of his monograph, which, though published in 1942, has just reached this country, the author treats several hybrids in the group.

Many Writings

THE GREYSTONE NATURE LOVER'S TREASURY. Selected and edited by Marshall McClintock, 790 pages, Greystone Press, New York, 1948. $3.50.

A weighty collection of writings on nature — classical, sentimental, humorous, serious. There is fiction, verse, straight description — almost any kind of writing one might choose in the field of plants and animals, weather, water, and man. Jack London stands beside Gilbert White. MacKinlay Kantor immediately precedes Mark Twain, Charles Darwin, and Marco Polo. John Burroughs, Ivan Turgenev, Zane Grey, and Henry Wallace Bates are among the other writers represented. Edgar Allen Poe and Henri Fabre are not overlooked. There are about 100 in all, with no reason or order in their arrangement — just one after another.

Notes, News, and Comment

Return from Conference. The Second South American Botanical Congress in Tucumán, Argentina, in October was at-

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Nurserymen and Plantsmen

Paterson Ave., E. Rutherford, N. J.

tended by 350 botanists from 18 countries, Dr. H. N. Moldenke reported upon his return to the New York Botanical Garden December 4. With Mrs. Moldenke he visited botanical institutions and other centers of learning in 22 countries and colonies on a trip which involved 21,000 miles of travel. He brought back greetings to the Garden from 200 South American scientists.

In Brazil Sept. 21, which was the first day of spring and Arbor Day as well, the Moldenkes were asked to plant the first two trees in a new section of the Botanical Garden in São Paulo. Dr. Moldenke set a four-foot seedling of *Coriniaria estrellensis,* one of Brazil's largest trees, in the ground, and Mrs. Moldenke followed by planting a specimen of *Tabebuia speciosa.* Other trees were then planted by the Governor of the State of São Paulo, the Secretary of Agriculture, and representatives of the University.

S. M. Zeller. A second heart attack in two weeks' time was fatal to Dr. Sanford M. Zeller of Corvallis, Oregon, Nov. 4. Dr. Zeller had become well known to eastern botanists during a four-month sojourn at the New York Botanical Garden, beginning Oct. 20, 1947. When he returned to his post as Professor of Plant Pathology at Oregon State College and Plant Pathologist at the Agricultural Experiment Station there, he had nearly completed the work, begun many years ago, on the Gasteromycetes for *North American Flora.*

The author of more than sixty scientific papers and bulletins, Dr. Zeller was a specialist in diseases of small fruits and stone fruits. He had been on the Experiment Station staff since 1919. In September he was elected Vice-President of the American Mycological Society, and had previously served as President of the American Phytopathological Society. He was a member of the honorary societies, Sigma Xi and Phi Kappa Phi.

Besides Mrs. Zeller, who accompanied him on his trip to New York, Dr. Zeller is survived by four daughters.

Holly Growers. Members of the American Holly Society held their annual meeting at the New York Botanical Garden Nov. 12. Part of their program consisted of an informal talk on diseases of holly by Dr. P. P. Pirone

Conifers. To identify the conifers of the Montgomery collection which have been planted at the New York Botanical Garden, Henry Teuscher, former Dendrologist here, now Superintendent of the Montreal Botanical Garden, spent three days in New York in early November.

Meetings. Dr. William J. Robbins attended the autumn meetings of the American Philosophical Society in Philadelphia Nov. 4 and 5, and also a committee on quartermaster problems of the National Research Council there Nov. 5. Dr. P. P. Pirone went to Pittsburgh Dec. 6 for meetings of the American Phytopathological Society the two days following.

In California, Dr. B. O. Dodge presented a paper on cytogenetical studies of lethel complexes in *Neurospora* before the National Academy of Sciences in Berkeley Nov. 15. In this he gave results of the work conducted during the summer with the assistance of Dr. Jesse R. Singleton. On Nov. 20, Dr. Dodge was the luncheon guest of Dr. G. W. Beadle at the California Institute of Technology at Pasadena.

Visitors. Major Albert Pam of England, authority on the Amaryllidaceae, brought seeds of a number of rare and unusual plants to the Garden on a visit made Oct. 30 with Jean De La Cour of the American Museum of Natural History.

Professor C. R. Florin of the Royal Paleobotanical Museum of Stockholm, Sweden, who returned to New York at a later date to address the Torrey Botanical Club, visited the New York Botanical Garden Nov. 8.

Dr. K. D. Bagchee, Forest Botanist, Forest Research Institute, Dehra, India, spent Nov. 22 and 24 at the Garden.

Dr. C. L. Wilson of Dartmouth College came on Dec. 6 to pursue his morphological studies of the melastomes for several days at the Garden.

Dr. A. C. Smith, who is now Curator of the Division of Phanerogams at the National Herbarium, came from Washington, D. C., Dec. 7 to work on the identification of some South American material.

Among other visitors toward the end of the year have been Dr. Koert Gerzon

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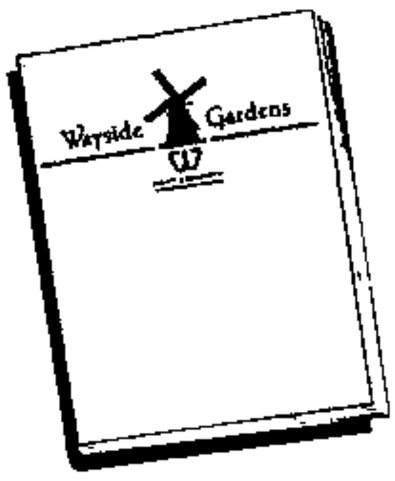

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of Cornell University; Dr. Kenneth Raper of Northern Regional Research Laboratory, Peoria, Ill.; Dr. Arturo Roque of the Agricultural Experiment Station, Rio Piedras, Puerto Rico; Dr. Alexander W. Evans, Yale University; John Stevenson, U.S.D.A. Bureau of Plant Industry, Beltsville, Md.; Ryozino Kinoshita, Osaka University, Japan; Dr. Margaret Fulford, University of Cincinnati; Conrad V. Morton, U. S. National Herbarium; Charles Beall, a recent Brown University graduate, former volunteer worker in Dr. Dodge's laboratory; and Walter Johnson and Clement Squier, Jr., from the New York State Agricultural Institute at Cobleskill.

Slime-Mold Studies. Mrs. R. W. Nauss, author of the article entitled "My Garden of Slime-Molds" in the Journal for May 1947 and speaker on the same subject at the Members' Day program of Feb. 6, 1946, has been granted space in the mycological herbarium for the prosecution of her scientific studies of the Myxomycetes.

Report from Venezuela. Writing from Puerto Ayacucho on Nov 15, Dr. Bassett Maguire said that he and Louis Politi, who are in Venezuela on the Kunhardt Sipapo expedition of the New York Botanical Garden, expected to reach the foot of the great mountain in another four days. They were about to begin a portage of 40 miles by motor truck around the Great Falls of the Orinoco, then proceed by river to their base camp at the foot of the mountain.

Oliver J. Smith. The printer who had worked on the first number of *North American Flora,* published by the New York Botanical Garden in 1905, died in Lancaster, Pa., Nov. 13. He was Oliver J. Smith, Vice-President of the Lancaster Press, Inc., with which he had been associated for 53 years. At the time of his death he was working on the forthcoming number of *North American Flora.*

Lectures. Dr. Robert S. de Ropp gave an address at Princeton in November on "Recent Studies on the Physiology of Plant Tumors." Among other recent talks by members of the staff are "Origins and Wanderings of our Flowering Plants" by Dr. W. H. Camp at the Brooklyn Institute of Arts and Sciences Nov. 23; "Flowers of Hawaii" by Dr. Donald P. Rogers at the annual meeting of the Advisory Council Dec. 2; "Bermuda" by Dr. F. J. Seaver before the White Plains Garden Club Dec. 3; "New Disease of Plane Trees" by Dr. P. P. Pirone for the New Jersey Shade Tree Conference Dec. 2, at which he also conducted a clinic on tree diseases.

Evolution. With Bobb Schaeffer of the American Museum of Natural History, Dr. W. H. Camp served on the local committee for the third annual meeting of the Society for the Study of Evolution, which took place in New York Nov. 11 13.

George Sautter. Twenty-five years of service in the Museum Building at the New York Botanical Garden came to an end Nov. 9 with the death of George Sautter, janitor. During much of this time it was he who hoisted the American flag in front of the building every morning and who pulled it down at the end of the day. Mr. Sautter was well known to Sunday visitors in the building. In recent years one of his principal weekday jobs was to apply preservative to the leatherbound books in the Garden's library.

Dr. Seaver Retires As Head Curator

Dr. Gleason Reappointed

WITH the retirement of Dr. F. J. Seaver at the end of 1948, Dr. H. A. Gleason resumes his former title of Head Curator.

At the same time, Dr. H. N. Moldenke, who was appointed Associate Curator in 1937, becomes Curator and Administrator of the Herbarium.

Dr. Seaver, who has been on the Garden's staff since 1908, first as Director of the Laboratories, then, since October 1911, as Curator until he was made Head Curator in 1943, has been given the title of Curator Emeritus. He and Mrs. Seaver are taking up their residence at Winter Park, Florida.

THE NEW YORK BOTANICAL GARDEN

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JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

FEBRUARY
1949

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ARRANGEMENT
AS PRACTISED
IN JAPAN

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FOR 1949

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OF DAYS GONE BY

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N.Y.B.G. EVENTS
AND NEWS NOTES

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NTS $1.50 A YEAR

MAGNOLIA BLOSSOM
IN WATERCOLOR BY
ELIZABETH HAMMELL
IN FEBRUARY EXHIBIT

FEBRUARY EVENTS AT THE GARDEN

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Designing the Home Grounds — 10 sessions on Thursdays — $15
2:30 - 4:30, Feb. 10 - April 14, 1949 — Instructor: *Alice L. Dustan*

Nature Study for Teachers — 15 sessions on Wednesdays — $10; to teachers, $5
4 - 6 p.m., Feb. 16 - June 1, 1949 — In charge of course: *G. L. Wittrock*
(Registration closed)

Free Saturday Programs

3 p.m. in the Lecture Hall

Feb. 5 ***The River and Work of Rivers***—A motion picture program

Feb. 12 ***Wanderings of our Flowering Plants*** — *W. H. Camp*, Associate Curator

Feb. 19 ***Hawaiian Scenes and Peoples*** — *Richard S. Cowan*, Technical Assistant

Feb. 26 ***Indoor Seed Sowing*** — *Ann Roe Robbins*, Author of "How to Grow Annuals"

Mar. 5 ***Dye Plants of the American Indian*** — *G. L. Wittrock*, Custodian of the Herbarium

Members' Day Programs

3 p.m., The New York Genealogical Society, 122 E. 58th St., New York

Feb. 2 ***Commentaries*** — *T. H. Everett*, Horticulturist, New York Botanical Garden
With an exhibition of plants from the Garden's greenhouses

Mar. 2 ***Roses of the Botanical Garden: Their Heritage from Josephine's Malmaison*** — *Edwin de T. Bechtel*, Member of the Board of Managers

Conservatory Displays

Seasonal flowering plants, in addition to the permanent exhibits of palms, cacti and other succulents, begonias, tropical ferns, aroids, rain forest plants, economic plants, and other subjects, daily, 10 a.m. to 4 p.m.

Museum Exhibits

Flower paintings by Elizabeth Hammell, on view daily, 10 a.m. to 5 p.m.

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JOURNAL

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CAROL H. WOODWARD, Editor

VOL. 50 FEBRUARY 1949 NO. 590

Flower Compositions for the Home in Eastern Asia

II. Development of Flower Art in Japan

By Ervin S. Ferry

"As years pass by
I grow older;
However, when I gaze upon flowers
I am not disturbed by my age."
Fujiwara Yoshifusa.

DURING the regency of Prince Shotoku Taisha (A.D. 593-602) many eminent Chinese artists, architects, authors, and Buddhist philosophers, as well as skilled artisans of bronze casting, silk culture and horticulture, were attracted to Japan. The Prince Regent was a liberal patron of painting and Buddhism. Many Buddhist temples were built and endowed for carrying on their work of religion as well as development of schools of instruction in literature, philosophy and the arts. One of the Japanese diplomatic messengers to China was an imperial prince and cousin of the regent named Ono no Imoko. Later he abandoned diplomatic service and retired to an IKENOBO (a hermitage beside a pond) within the precincts of the Rokkaku Temple in Kyoto.

Here he devoted himself to making floral sacrifices for the temple and floral decorations to be placed before the memorial tablet of his famous kinsman. He was endowed not only with much piety and love of nature but also with imagination and artistic sensibility. He studied so effectively the power that the love of flowers has in harmonizing man with nature that he succeeded in making compositions which not only were beautiful but also expressed to sensitive beholders some idea, some virtue, sentiment or aspiration. The principles which he enunciated and methods which he practised became famous. Gradually, his ikenobo became a pilgrimage spot for priests who strove to acquire his insight, imagination, principles and methods.

In this way began in Japan the first exposition of principles for the design of aesthetic flower compositions expressing an idea. His system of principles gradually developed into what now is known as the Ikenobo School of Flower Arrangement. The Rokkaku temple bestowed upon Ono no Imoko the title Head Flower Master. On his death, this title was bestowed upon his son. Thereafter the title has gone to each succeeding chief priest of the temple. The present holder of the title is the forty-fifth successor of Ono no Imoko.

Japanese flower masters assume that Prince Regent Shotoku and Ono no Imoko had observed flower decorations for temple use during their diplomatic missions in China and with these models in mind inaugurated the system of flower composition now known by the Japanese name IKEBANA (flower placing). During the two centuries following the death of Ono no Imoko, ikebana was a study practised by Buddhist priests who made huge elaborate designs ten feet or more in height and width that would suggest philosophic ideas to the mind of a trained observer. These early masters insisted that in arranging plant material one should strive not only to compose an aesthetic design, but, even more important, one should strive to beautify one's temperament by combining love of nature with love of man. The ideal perfection is conceived to be the state in which the soul of the composer is expressed in his composition and the beauty of the composition exalts the mind of the beholder.

Modern successors of these early temple compositions are much reduced in size and increased in elaboration and refinement. They are seen only on special occasions in the imperial palace, in a large Buddhist temple, at a great state function or occasionally at an exhibition of the Japanese Flower Artists Association. A modern example of this so-called Rikkwa style is shown opposite. This was some seven feet high and required at least fifty hours for its construction.

During the first part of the ninth century Emperor Saga abdicated and retired to a country estate near Kyoto now occupied by the Daikakuji Temple. Here, he and his intimates devoted themselves to poetry and aesthetic accomplishments. It is related that one day while the emperor and a few friends were enjoying a little relaxation in a boat on a pond within the landscaped garden, they stopped at a little island where the emperor plucked some chrysanthemums and, placing them with apparent

---

ELABORATE COMPOSITION IN THE RIKKWA STYLE

(On the opposite page)

Very few people, even in Japan, have ever seen an arrangement of this type, as it is seldom used outside of the Imperial palace or a Buddhist temple. The original of the composition illustrated here, which was created by Goto Shoichi of the Ikenobo School of Flower Arrangement, stood seven feet high and required fifty hours of artistic labor to produce.

大正十四年十一月十六日
家元七夕會立之

後藤正

THREE COMPOSITIONS IN SHOKWA OR KAKKWA STYLE

Left, iris denote vitality and strength and are therefore suitable for a Boys' Day celebration, an annual event in Japan. The style is that of the Ikenobo. *Center,* occidental artists working in the Japanese style use dogwood as a symbol of the crucifixion. The curve of the branches is the characteristic curve of Japanese flower arrangements. This is in the style of the Misho-onryu. *Right,* the small branch of chrysanthemums at the base of the composition is the tertiary element, characteristic of the Senkei-ryu. The dignity of this composition makes it suitable for the desk of a speaker.

lack of care in a vessel of water, said, "When you present flowers to me arrange them simply like this." Emperor Saga's model is the reputed origin of the NAGEIRE (thrown in) style, according to the Saga-onryu (Distinguished Saga school)[1] of ikebana. The emperor's patronage and simplified style resulted in the flower art being seriously studied and practised by the nobility and literati. Whereas up to this time ikebana was ecclesiastic, it now became aristocratic. Many flower masters occupied important positions in the imperial court and in the entourage of nobles, including famous generals. In the seventeenth century Emperor Gomizuno was so devoted to ikebana that the shogun reigning at that time ordered all DAIMYO (provincial governors) to study the flower art.

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[1] The prefix ON-, signifying "distinguished," attached to the word RYU, meaning "school," indicates that the school is of imperial origin. Just as the Saga-onryu was founded as a result of a suggestion of the Emperor Saga, in the same temple, about a century later, the Misho-onryu was established.

Later, the development of many additional styles as well as the wide diffusion of culture so popularized ikebana that at the present time in Japan it occupies about the same place in popular esteem as does music in occidental countries. The intense interest in the subject is indicated by the number of active societies devoted to its study, its large number of well supported periodicals and books and numerous well attended exhibitions. Each of the annual exhibitions of the Japanese Flower Artists Association held in recent years has had not less than three thousand exhibits of flower compositions. The rules which govern these arrangements today stem from the Six Canons of Hsieh Ho, which originated nearly 1,500 years ago in China.

The first fundamental principle of the flower art in Japan is: *Every composition should consist of plant material apparently growing as in its natural environment.* In accordance with this principle the following directives are observed:

(a) Branches and flowers must not appear to be amputated from their roots and stuck in a vase or bound in a bunch. The lower ends should be hidden as though rooted in the ground.

(b) In any composition the ratio of the number of leaves to flowers should not be far different from that of the same plant when growing at the same time of the

TWO COMPOSITIONS IN THE MORIBANA STYLE

Aesthetic arrangement of color and mass are stressed here, without sacrifice of line.

DEEP, GRACEFUL CURVES OF THE ENSHU GROUP OF SCHOOLS

Requiring the greatest skill because of the difficult technique of producing curves in naturally straight branches, the arrangements of the Enshu schools are the most artificial of all. The curve of the legs of the stand is part of the design.

year. Many compositions may have leaves without flowers, but a composition should be made without leaves only when the blossoms appear on the branches in spring before any leaves are to be seen.

(c) To give a composition the required appearance of vitality, all branch tips, buds and flowers that naturally point upward while growing should point upward in the composition, though not necessarily vertically.

(d) Most flowers and most branch tips of a growing plant direct themselves toward the incident light. On the side of the plant receiving most light the foliage is most fully developed, is densest and darkest in color. These appearances should be reproduced in any composition intended to simulate a living plant or group of plant material.

The second fundamental principle is: *Every flower composition should be a work of art of aesthetic value as decoration.* Every composition should be planned in accordance with the following bases of aesthetic composition: unity of design, harmony of its parts, harmony with its environment, color harmony, rhythm, and aesthetic balance.

Unity of design involves a correct proportion between the relative lengths of the component branches and flower stalks as well as a correct proportion between the size of the group of plant material to the container, to the supporting stand, and to the place of display. *Color harmonies* may be produced by a proper selection of colors and areas of flowers and foliage. *Line harmonies* are effected by curvatures and lengths of lines in a group. *Rhythm* may be produced by adjustment of spacings of leaves, flowers and prominent branch tips, as well as by alternations of larger and smaller leaves and flowers. *Aesthetic balance* is the appearance of dynamic strength to resist force as may be exhibited, for example, by plants rooted in the ground that either are dissymmetric, windswept, or overhanging a cliff or riverbank. It depends upon a visible support as well as upon the positions and attitudes of branches and foliage.

By varying these elements of aesthetic composition an immense number of different patterns can be formed. Some will be superior to others, although all may be faultless. A superior aesthetic design made of plant material in accord with the first fundamental principle constitutes an ikebana composition. If it be so outstanding that it is accepted as a model by a large number of competent masters it may become the norm of a style. The body of principles accepted, together with the methods and techniques practised by a body of qualified adherents, is called a RYU (school or system) of ikebana. The Ikenobo-ryu, the oldest and largest, claims a million and a half present and living former students. There are several hundred recognized schools of ikebana, all adhering to the first principle but differing in the application of the elements of aesthetic composition. The adherents of each school practise several styles, the ones most widely practised being called the SHOKWA or KAKKWA, the NAGEIRE and the MORIBANA.

IN THE NAGEIRE STYLE

These compositions represent two of the thirty named variants of the Nageire style as carried out by Saga-onryu masters. The basket at the left hangs against stalks of bamboo, fastened together. The stand for the jar below is of three separate pieces of teakwood.

Of all the styles of ikebana, the Kakkwa holds the highest place in popular esteem. It is considered to be highly aesthetic and to lend itself best to expression of the composer's emotions. Its distinguishing form is that of a tree. Compositions in the Shokwa or Kakkwa style, according to three ancient conservative schools, are illustrated on page 28 for the Ikenobo-ryu (left) ; for the Misho-onryu (center) ; and for the Senkei-ryu (right). In the conventionalized compositions designed by masters of some of the Enshu group of schools much artifice is practised in constructing deep curves of graceful shapes. On page 30 is a beautiful example of a formal composition by an eminent master of one of these Enshu schools.

A design in the Nageire style represents either a single plant or a compact group of plants that might grow near one another at the same season of the year. Naturalness with artistic unity and dynamic beauty are the keynotes of the Nageire style. There is an immense number of forms of the Nageire style. Saga-onryu masters alone practise thirty named variants, two of which are shown on page 32.

Without ignoring the charm of line and symbolism, the Moribana style, shown on page 29, stresses aesthetic arrangement of color and mass. Usually the plant material is mounted in a broad basin or shallow bowl. By proper selection and distribution of material a composition in this style may suggest the season, a bit of natural scenery beside the river, in a field or on the mountainside. Its prime purpose is decoration of the home.

An Outmoded Tree

Some Thoughts on the Rubber Plant of Yesteryear

By Mary F. Barrett

IN a waiting-room last summer I saw an old-time rubber plant growing in a tub. In contrast to the usual lanky specimen this little tree had a crown diameter about equal to its height: five feet. From the base of the horizontal lower branches came little aerial roots almost long enough to reach the soil, while other smaller ones dangled from points farther along the limbs. The opening terminal buds were conspicuous because of their long pink scales, and the big elliptical leaves with their very numerous parallel side veins seemed too large for the young plant.

As I looked at this embryo tree my mind's eye recorded a picture of an enormous tree in Coconut Grove, Florida[1] which seemed to be the waiting-

[1] This tree was located at the grounds of No. 2951 South Bay Shore Drive, near the former Pan-American Airways base at Dinner Key, close to the line between Miami proper and Coconut Grove.

FIDDLESTICKS

Fiddle-Leaf Fig is replacing the old rubberplant.
—*Home and Garden Magazine.*

FIDDLE-DEE-DEE, the fiddle-leaf fig
May be fairer, fancier, twice as big
And, as of the moment, Fashion's pet,
The pampered dear of the carriage set,
Admired by fast-stepping sycophants—
But I'm no snubber of rubberplants.
O glossy, elegant shaft of greenery,
Pride of the swankest parlor scenery,
Shrined in the White House in 1903
And plenty good enough now for me.

—ETHEL JACOBSON.

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room plant, grown up. The shape was the same, but on a large scale of magnification. The aerial roots near the stem had enlarged and wrapped themselves around the trunk, and then had continued their growth to form prop roots at the trunk's base, or tall thin buttresses, or snake-like over-ground roots extending many feet from the foot of the tree. The dangling roots from the middle of the lowest branches had fastened themselves in the ground and had become thickened, thus forming props by which those heavy limbs maintained their horizontal position. Only the leaves and the elongating bud-scales were about the same size as in the tub specimen.

This plant really is a *Ficus*, or fig-tree, although its small figs are so insignificant, especially when compared with the copious sticky and milky latex which is produced from leaves and woody parts, that they seldom are even mentioned.

The rubber tree received its botanical name first in 1814[2] from William Roxburgh (1759-1815), although no adequate description was published until 1819, when Hornemann of the Royal Botanical Garden at Copenhagen listed[3] a few characters of the species, under Roxburgh's title.

Roxburgh's notes published in 1832[4] tell of his first meeting with this plant. In 1810, while he was superintendent of the East India Company's Botanic Garden at Calcutta, India, he received a present of honey in a bottle-shaped rattan basket. As a basket was scarcely a conventional receptacle for honey, especially in the climate of Calcutta, Roxburgh investigated the interior of the container and found it lined with a sheet of a substance which he recognized as the hardened latex of some kind of fig-tree. It

[2] Roxburgh, Hort. Beng. 65. 1814.
[3] Hornemann, Hort. Bot. Hafn. Suppl. 7. 1819.
[4] Roxburgh, Fl. Ind. 3: 541-545. 1832.

stretched when he pulled it and so suggested to him the name *Ficus elastica*. He tested the material with various solvents and found it resisted almost all except the juice of the cajeput tree (*Melaleuca Leucadendron*), an Indian species which, incidentally, now is often seen along avenues in southern Florida.

Roxburgh communicated with the donor of the honey, found that the tree from which the latex came grew in Sylhet, Assam, in northeastern India, where the natives used the juice to waterproof some permeable substances; and arranged to have living specimens sent to the Calcutta Garden. From there Roxburgh seems to have distributed plants to various other botanical gardens, for the rubber tree of India was reported in cultivation in England and Denmark by 1815, and in several other countries soon afterward.

It was not long before men realized the commercial value of this, the stickiest of fig-trees, for it was in the 1830's that Goodyear made his revolutionary experiments which resulted in the rubber products of the 19th century.

About 50 years later South American, or Para rubber trees[5], were learned to be more valuable than the Indian species and were transplanted in large numbers to the Orient. After they became productive the great plantations of *Ficus elastica* were no longer kept up to any great extent. But by that time the vogue of the rubber tree as a house plant had begun. In the late 19th and early 20th centuries it was said that 80,000 specimens were sold in America in a single year, while in Germany, where many of them were produced for export, they were so common that they were called the Berlin weed. I recall that, as a child, I once completed the cycle of "rubber to rubber" by printing my name with an inked rubber stamp on the leaves of a rubber plant.

In those days living quarters were large, and the apparatus for heating them often generated gas poisonous to many plants. The problem then was to find something which would help to fill up a room and which would live through all seasons with a minimum of care. Under the present conditions a plant which in its native home becomes a giant in size and a banyan in habit is as much out of place as a St. Bernard dog in a small apartment. Durability still is desired, but bulk has given way to small proportions, and *Sansevieria* and *Philodendron* have supplanted *Ficus elastica* as household decorations.

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[5] *Hevea brasiliensis.*

Daylilies Being Introduced in 1949

By A. B. Stout

NEW daylilies developed by Dr. A. B. Stout, which are to be introduced into gardens this year by the Farr Nursery Company, add variety, especially in the stature of the plants. Descriptions of a new dwarf race and of five distinctive clones are given below. The Farr Nursery Company has handled the propagation and distribution of Dr. Stout's daylilies throughout his more than thirty years of work on this group at the New York Botanical Garden, and will continue to propagate and distribute his originations in the genus *Hemerocallis*.

C.H.W.

A typical plant of the new group called the "Elfin Daylilies."

Elfin Daylilies blooming with Darwin Tulips in a garden in May.

The Elfin Daylilies

THE horticultural name of ***Elfin Daylilies*** is here given to a dwarf race obtained by selective breeding of wild stocks of the species *Hemerocallis Middendorfii.* Several collections of living plants and of seeds were received by the writer from widely separated localities in the Orient. These plants displayed much diversity in stature and habits of growth. Some have not exceeded 20 inches in height over a period of ten years, which is ample time for a daylily to attain its full stature.

The plant shown on page 36 is representative of the group, although some have flowers that are somewhat smaller and less full and the foliage more slender. This is one of the many plants grown from wild seed and used as a parent in the breeding of this group.

The flowers, which are day-blooming, are of good size, spreading and saucer-shaped in form, and clear orange in coloring. There are often three, and sometimes four, clustered flowers on scapes that stand slightly above the mound of leaves. The ***Elfin Daylilies*** are among the earliest of daylilies in flowering; at New York they are usually in good bloom on May 15 when Darwin tulips are in bloom. This race is fully dormant in winter and hardy in the northern states.

The Red Knight and Red Lady Daylilies

The two clones called the ***Red Knight*** and ***Red Lady Daylilies*** are sister seedlings that differ only slightly in stature and flower coloring. It has been decided that the two will be named as a pair that may be planted effectively together in gardens. They will blend in a unity of mass effect and color scheme, and on close inspection their points of distinction will add interest. The flowers, as illustrated on page 38, have a spread of about five inches.

The color pattern is two-toned; the throat is yellow and the blades are a

Flowers of the new Red Knight and Red Lady Daylilies, sister seedlings of similar two-toned yellow and scarlet colorings, Red Knight being the darker of the two.

shade of scarlet red (one of the standardized spectrum colors of Ridgway in "Color Standards and Color Nomenclature") that is almost nopal red. This is near the scarlet of the "Garden Dictionary" edited by Norman Taylor, and near 5 L 10 of Maerz & Paul, "A Dictionary of Color."

There is a slender but not very conspicuous stripe from the throat along the midvein of the petals. The intensity of the red pigments is only slightly darker in the mid-zone of the blades next to the throat. The shade of coloring is slightly darker in flowers of the ***Red Knight*** and the plants reach a height of four feet, which is about ten inches taller than the scapes of ***Red Lady***.

At New York, both clones are in maximum bloom during late July and the blooming has continued until mid-August. The foliage becomes dormant in winter and the plants have thus far been fully hardy at New York and in the plantings of the Farr Nursery Company at Weiser Park, Pennsylvania.

The Cathay Daylily

The scapes of well-grown plants the ***Cathay Daylily*** grow to a heig of 38 inches and they are erect, we branched, and rather slender. The leav are narrow and the foliage evergre but rather wiry and reasonably hard The climax of flowering at New Yo comes in mid-July. The dominant colo of the flowers are a golden orange the throat and scarlet red on the blad At the base of the blade-coloring ne to the throat the shade of red is dark and approaches carmine, but this blended and does not form a sharp m zone as in the blooms of ***Fiftieth An*** *versary* (described in the Journal I April 1946).

The Ming Daylily

In comparison with the ***Majestic D*** ***lily*** the ***Ming Daylily*** has taller scap flowers with less reflexed and m pinched and twisted petals, and a sor what later period of bloom. The flov

coloring is almost uniformly orange (Ridgway), which is nearer the cadmium yellow of Maerz & Paul. The flowers are large with a spread of as much as six inches. The scapes reach a height of four feet. The foliage is evergreen but not lush.

The Challenger Daylily

Mr. H. G. Seyler of the Farr Nursery Company has called the dominant coloring of the flowers of the ***Challenger Daylily*** "cherry red;" the writer has called it "rose red." The throat of the flower is pale greenish yellow, somewhat tinged with orange, with a strong stripe which extends along the midvein of the petals and becomes almost white. The blade-coloring is between carmine and nopal red of Ridgway and near cardinal of the "Garden Dictionary" and it is most dense where the red pigments of the blades meet the yellow and orange of the throat.

The scapes rise to a height of four feet; the foliage is evergreen but not lush and thus far the plants have had very little winter injury. The period of bloom at New York has been mid and late July.

Air Mail Letter From Kunhardt Sipapo Expedition

Savanna Camp—4,500 feet
Cerro Paraque (Sipapo)

January 4, 1949

CERRO PARAQUE is a terrific mountain, between 6,000 and 7,000 feet high, apparently ringed by very high and difficult escarpments. The mountain appears to be about 8 or 10 kilometers across and considerably longer. The interior is strongly carved and dissected, the heavy rains draining off into "Caño Profundo," a tremendous chasm about 3,000 meters deep, and then off to the south by the beautiful Caño Negro, a blackwater stream that flows southward through some 10 or more kilometers of savanna and low mossy forest to spill off the mountain at a point not reached—nor likely to be reached—by us.

The peripheral rim or escarpment is dramatically rugged and dissected, vegetated by savanna and low scrubby thickets, in the depressions and crevasses by mossy cloud forest. . .

Our collections will be substantial and I think of considerable diversity and interest; for instance, in the Euphorbiaceous genus *Phyllanthus* we have five species here. Only one is known to me—and none are those of Duida or Auyantepui. So far we have collected four species in the Rapataceae—one is known from Duida. So far as I know the other three are new. One may represent a new genus. . . .

I believe we'll be able to get back a real contribution to the living plant collection. . .

Our camp is at 4,500 feet on a broad savanna. Near by is a fine stream of black water. In fact, we were very fortunate in the selection of a camp site, for it has proved to be the best we've seen to date—the most attractive, comfortable, convenient, and most free of insect pests.

Game has not been plentiful but we have had pig and bush turkey.

The dry season has set in. It rains usually in the afternoon or evening, but not heavily. In the early days it rained as much as 7.5 cm. in a single day. Then the canyons and cliffs were very awe-inspiring with great waterfalls plummeting over them, some falls a thousand or more feet high. On top here the temperature is very fine with maximums in the day up to 76° and minimums at night down to 56°. We get sunshine enough to dry our plant boxes and send them off the mountain dry. Four large brown bags full are already in base camp.

As desirable as it would be to get a brief look at Duida, other more immediate problems have developed. Just to the south is a huge massif called Cerro Autana. It has never been climbed. The actual Cerro Sipapo is about 30 or 40 kilometers to the southeast.

Often the question rises as to just how closely endemic the plants of a mountain region really are. A brief inspection of these two mountains would tell us a lot about the distribution and differentiation pattern. I am going to try to get this brief look—no extensive collections but small ones for the record.

BASSETT MAGUIRE.

NOTICES AND REVIEWS OF RECENT BOOKS

Harvey's Life of David Douglas

DOUGLAS OF THE FIR. A Biography of David Douglas, Botanist. Athelstan George Harvey. 290 pages, illustrated, indexed. Harvard University Press, Cambridge, 1947. $4.

David Douglas, immortalized in the Douglas fir, will always remain the best known name among the botanical explorers of the Great West. Douglas lived strenuously from his Scottish birth in 1799 until his tragic death in the Hawaiian Islands at the age of 35. For ten years he collected relentlessly indeed, his friends said "passionately" –all the way from Santa Barbara, California, to York Factory on Hudson Bay, not to mention his stopover at Rio de Janeiro and his hurried visit to New York and Pennsylvania. He confided to his journals his impressions of mountains, manners and men. Some of the most important journals were lost by mishap, as in fording rivers, but from the surviving writings and from the many letters written to William J. Hooker of Kew and others, biographer Harvey of Vancouver, B. C., has written a balanced portrait of "Don David."

From his youthful days of bannocks and milk, and those of his worshipful chumming with Hooker in the Scottish Highlands, to his last journey to Hawaii, the story moves easily through twenty chapters. First shipping from Gravesend aboard the *William and Ann* with John Scouler, then beholding the majestic forests of the mouth of the Columbia near present Astoria and slipping by canoe through the "sublimely grand" Columbia River country, now portaging across Cape Disappointment, now barely escaping Indian treachery, suffering physical misery and pain, breathing fast with the joy of discovery, shivering over campfires of dried horse dung or warming in the companionship of a hot cup of tea, Douglas fulfilled Hooker's estimate when he wrote that Douglas's "great activity, undaunted courage, singular abstemiousness, and energetic zeal at once pointed him out as an individual eminently calculated to do himself credit as a scientific traveler."

"How irksome a night is to such a one as me under my circumstances!" Thus Douglas wrote on the occasion of his quest for the sugar pine in the mountains of southern Oregon in October, 1826. "Cannot speak a word to my guide, not a book to read, constantly in expectation of an attack . with my gun beside me, writing by the light of my Columbian candle—namely, a piece of wood containing rosin." How the words recall those of another naturalist on another continent about a century later: "Science is a jealous mistress and takes little thought of a man's feelings!" Thus wrote Carl Akeley on the slopes of Kenya. When Douglas was snowshoeing across Athabaska Pass one of the party shot a grouse, the first of its kind Douglas had ever seen. Though prized by the voyageurs for its tender flesh, Douglas packed the bird back to England and later in a paper before the Linnean Society of London described it as Franklin's grouse. Today the specimen may be seen in the Royal Scottish Museum of Edinburgh.

This biography, warmly told and well documented, has few errors of typography, fewer of fact. Thus, for "James K. Townsend" (p. 243), read "John K. Townsend." And the "Trichostem lanceolateum" should of course be *Trichostema lanceolatum* (p. 94). The sentence "never before had the primeval forests of the Columbia felt a botanist's footsteps," (p. 48) is not quite correct when Meriwether Lewis, who founded Fort Clatsop at the mouth of the Columbia River, collected plants thereabouts in January, 1806! Indeed, *Gaultheria shallon* and *Rubus spectabilis* mentioned by Harvey in the same paragraph were collected by Lewis in this region and described by Frederick Pursh from Lewis's specimens.

A few modern equivalents for older names would have been helpful, for example, *Gymnogyps californianus* for the California condor; *Lophortyx californica* for the quail. "Triphora pendula" is evidently an exact synonym of *Pogonia pendula* (p. 38). Certain ornithological papers bearing on birds taken by Douglas

are not mentioned. These are noticed by Joseph Grinnell (Pac. Coast Avifauna 5·7. 1909, etc).

But these addenda or errata are trifling beside the uniformly high quality of this acute and authoritative biography. From the first page of chapter one where Harvey corrects an oft-repeated error of 1798 for that of 1799 as Douglas' birth year, there is abundant evidence of the care for detail that marks a definitive book. On August 1, 1943, the Liberty ship *David Douglas* was launched at Portland. Four years later Harvey's attractive octavo "Douglas of the Fir" slipped from its berth, the Harvard University Press, —two packets, with, in the words of Masefield, "all the marvelous beauty of their bows."

JOSEPH EWAN,
Tulane University.

Two Decades of Research In Plant Physiology

GROWTH OF PLANTS. William Crocker, with the collaboration of his professional associates. 459 pages, illustrated, indexed. Reinhold, New York, 1948. $10.

The sub-title of "Growth of Plants" is "Twenty Years' Research at Boyce Thompson Institute." The objectives of the Institute are set forth in the introduction, which also presents a brief account of its founder, Colonel William Boyce Thompson. The book's twelve chapters report not only the findings of the Institute staff, but give an account of related work that is important to the reader's understanding of Institute contributions. "Only such outside researches are discussed as are necessary to orient the work at the Institute generally in the whole field of plant science."

The principal chapters cover such subjects as seeds, their dormancy and life span, the physiological effects of ethylene chlorohydrin and other unsaturated hydrocarbon-containing gases on plant growth, and the physiological effects of certain lethal gases upon plants and animals. Also among the main chapters are those on plant hormones, bud dormancy, growth of plants under controlled conditions, plant cell membranes, and investigations on fungicides and insecticides. The last chapter in the book bears the title "Miscellaneous," and its subject matter covers such diverse topics as potato chips, determination of isoelectric points, flower color in hydrangea, soil studies, and propagation of trailing arbutus and lycopodium; under several of these headings (as well as throughout the book) there is theoretical plant physiology in good measure. It is interesting to note that many of the problems that have been under investigation are now solved and terminated—a commendable example.

The first fourteen volumes of the Contributions of the Boyce Thompson Institute include some 526 articles, printed on more than 7,000 pages. In giving an account of the first twenty years of the Institute's activities, it is highly appropriate for Dr. Crocker and his colleagues to digest the work with which they have been so intimately concerned in a 459-page book. They have reported well on the first two decades of the world's outstanding privately supported institute of plant physiology.

GEORGE S. AVERY, JR.,
Director,
Brooklyn Botanic Garden.

Vivid Portrayal of Some Early Explorers in America

THE ROYAL BOTANICAL EXPEDITION TO NEW SPAIN. H. W. Rickett. 83 pages, illustrated, indexed. Vol. II, Part 1, of *Chronica Botanica,* Waltham, Mass.; Stechert-Hafner, New York, 1947. $2.50.

Rare indeed are the historical writings in science which combine the qualities exhibited by this critical description of the botanical efforts of Sessé and Mociño in the New World. Delving into the difficult files of the *Archivo General* of Mexico, the author diligently and patiently extracts the useful facts and shrewdly reconstructs, interprets and evaluates the lives of these botanists and their colleagues from the time they are appointed by the Kings of Spain until they are no longer pertinent to the Expedition. The personalities of the characters are so vividly portrayed that the reader often forgets that he is not reading a novel. The complaining of Senseve, Mociño's troubles with his wife, Doña María, and the contrary stubbornness of Longinos Martínez recounted in the humorous style of the author, add delightful spice to the story.

However, the basis for each statement is documented, and a careful reading of the history will give the modern visitor to Mexico a background for understanding the manner in which official matters are handled today.

It is hoped that the history of botany will be further enhanced by more writings from the same author.

A. J. SHARP,
The University of Tennessee.

Botany of the Past

BOTANIK DER GEGENWART UND VORZEIT (Botany of the Present and Past). Karl F. W. Jessen. 495 pages, indexed. Facsimile reprint. Chronica Botanica Co., Waltham 54, Mass. Stechert-Hafner, New York, 1948. $6.

Since this book was originally published in 1864, it obviously omits nearly a century of most important developments in botany. More than half the book is devoted to plant-lore from the earliest times through the seventeenth century. The evolution of plant science from medicine and folklore is discussed fully and the relation of early science to general human culture is well presented. This half of the book might well be read by every botanical student who can handle the rather difficult German in which the book is written.

H. A. GLEASON.

D.P. Homes in South America

VOICE FROM THE WILDERNESS. R. W. Thompson, 238 pages, illustrated. MacDonald & Co., Ltd., London. Second printing, 1947. 10/6 net.

In the 1930's R. W. Thompson traveled through portions of Argentina and Paraguay visiting the newly formed agricultural colonies of British, German, Polish, Swiss and Japanese settlers. In view of the present concern for the displaced persons in Europe this book is worth careful scrutiny. Thompson brings out well the problems involved in establishing any new community in a wilderness. The problems of maintaining agriculture, of transportation and of marketing, and the emotional and physical adjustments required of these settlers are well discussed in this book and make it up-to-date reading.

R. A. HOWARD.

Up-to-Date Ways in Tree Care

MAINTENANCE OF SHADE AND ORNAMENTAL TREES. P. P. Pirone. 436 pages, illustrations, bibliography, index. Oxford University Press, New York. Second edition, 1948. $6.50.

Dr. P. P. Pirone's book "Maintenance of Shade and Ornamental Trees" is too well known to arborists, city foresters and tree wardens to justify review for these workers. Review for tree owners and tree lovers is, however, imperative since for them also this book is a "must." In it they will find a wealth of information clearly and concisely presented.

Part I of the book deals with general maintenance practices. It begins with a chapter on the structure and function of tree parts. Soil relationships follow, including discussion of the important air, water, and organic content of the soil, together with valuable suggestions for soil improvement. A helpful table of soil reaction adaptations is included. Explicit directions for transplanting are given. Fertilizers and their application are presented in a well-rounded picture. Pruning, cavity work and bracing follow. A chapter helpful to the selection of the more suitable species for street and roadside planting closes the first section of the book.

Part II deals with abnormalities of trees. It tells how to diagnose tree troubles, how to detect and treat nonparasitic injuries, insect injuries and tree diseases. Troubles affecting specific trees are very thoroughly discussed and suitable remedial measures presented in listings made alphabetically according to the common name of the tree, but divided into two natural groupings to separate deciduous and evergreen forms.

A well selected bibliography closing the volume will be helpful to the reader who wishes further to explore subjects too comprehensive for inclusion.

Those who have copies of the first edition, issued in 1941, will be interested in the new printing. There is no change of context. A list of eight corrections in spelling or nomenclature precedes the table of contents. A 13-page appendix brings the reader up to date on pesticides, mist blowers, chain saws, wound dressings, chemical injury, and several insect pests and diseases. Sixteen refer-

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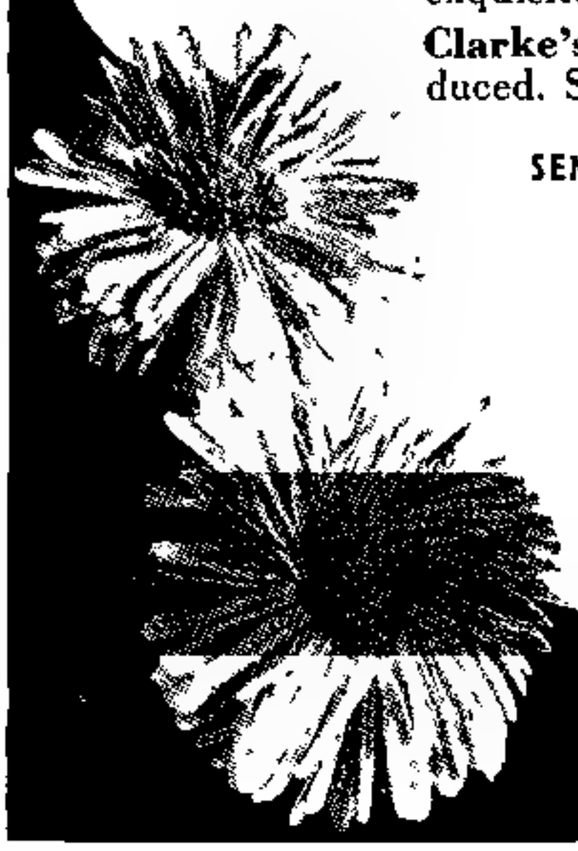
HARDY ASTER Plenty



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Wayside Gardens

ences have been added to the selected bibliography. Seven of the original figures illustrating the text have been changed. In one modernization a mist blower replaces hydraulic equipment but its unchanged caption still draws attention to the solid stream issuing from its nozzle.

For a publication so rich in illustrations, it is to be regretted that the halftones of the second edition do not have the same clarity found in the earlier publication. To Dr. Pirone's host of personal admirers this shortcoming will be more than compensated for by the fact that the cover jacket, in marked contrast to the first, bears a truly handsome and life-like photograph of "Pat" himself.

RUSH P. MARSHALL,
Bartlett Tree Research Laboratories
Stamford, Conn.

With Saw and Shears

THE PRUNING BOOK. G. L. Wittrock. 172 pages, illustrated, indexed. Rodale Press, Emmaus, Pa. 1948. $2.75.

Mr. Wittrock* presents useful and authentic information on the subject of pruning trees, shrubs and vines which are used for food, as well as ornamentals. Scattered through its pages are valuable cultural hints. This book will serve as a practical text for the novice and those owners of new properties who wish to acquire some knowledge of why, when, and which to prune of the woody plants found growing on their grounds. From this information it will become easier to acquire that knack of *how* to prune, which is gained by years of experience and observation of the growth habits of one's plants.

The chapter on pruning of special classes of plants will interest the professional and the experienced amateur.

As far as it is possible to condense the broad subject of pruning into a single volume, the author has made a wise selection and convenient arrangement of his material, and he has made his subject matter clear by use of photographs and drawings.

LOUIS VAN DE BOE.
Briarcliff Manor, N. Y.

*Whose first name is not Gustav, but *Gustave*, and who, at the time of writing, was not the Curator, but the *Custodian* of the Botanical Garden's Herbarium.—C. H. W.

Multiplying Woody Plants

PROPAGATION OF TREES, SHRUBS, AND CONIFERS. Wilfred G. Sheat. 479 pages, illustrated, indexed. Macmillan, New York. 1948. $7.50.

This book, written in England, is well worth the attention of commercial or amateur propagators prepared to allow for some differences in climate and seasons between the two countries.

It treats the genera in alphabetical order and, in very many instances, species or groups of species are dealt with separately when more than one method of propagation is desirable or necessary.

While many of the plants mentioned are not hardy in northeastern America, those with which we are familiar are not neglected, and a perusal of the book may encourage the propagation of a wider selection of desirable trees and shrubs than can be readily obtained at this time. The illustrations are excellent.

J. H. BEALE,
Boyce Thompson Institute

Help for Beginning Gardeners

LEARNING TO GARDEN. Olive Mason Gunnison. 388 pages, indexed, illustrated with drawings by Anne Seaman. Funk & Wagnalls, New York, 1948. $2.85.

It is always a pleasure to come on a good garden book.

Olive Mason Gunnison has put her long experience at the service of beginning gardeners, and she tells them many simple rules.

Long years back—it seems as if it must have been in the Carboniferous Age a beginner's troubles faced this reviewer. A polite note would come from a dealer: "If the ground is not ready for your rose plants, heel them in." The message might as well have been written in Greek. What was "heeling in?" After a long, hurried search before the roses arrived, the explanation turned up in an old "Farmer's Almanack." Mrs. Gunnison tells what "heeling in" means and tells many other things too.

She tells of soil and fertilizers, not quite in words of one syllable, but plainly; also of general care of the garden, annuals and perennials, roses, hedges, insects, annuals listed according to color, perennials which will grow in shade, lilies,

shrubs, even plants for city gardens. The illustrations by Anne Seaman are simple but good. Mrs. Gunnison also knows her botanical names and spells them and common names correctly.

It is a good book. Mr. Everett must agree with me or he would not have written a foreword. "Learning to Garden" will help many beginners and more advanced gardeners as well.

SARAH V. COOMBS.

Story of the U.S.D.A.

TWO BLADES OF GRASS. T. Swann Harding. 332 pages, illustrated, indexed. University of Oklahoma Press, Norman, Okla. 1947. $3.50.

In 1836 Henry Leavitt Ellsworth became Commissioner of Patents of the United States. In his annual reports he invited the attention of the Congress to the importance of agriculture and requested funds for the collection and dissemination of seeds and statistics. From these humble beginnings came the great U. S. Department of Agriculture of today with its associated state experiment stations, including thousands of scientific and clerical workers, special libraries, modern laboratories—the largest institution of its kind in the world.

Harding in this book traces the growth of the department and sketches the personalities concerned — H. W. Wiley, "father of the pure food law;" Erwin F. Smith, discoverer of bacterial diseases of plants; B. T. Galloway, first plant pathologist and first chief of the Bureau of Plant Industry; W. O. Atwater, pioneer in the study of nutrition; Gifford Pinchot, one of the founders of forestry in this country; Walter T. Swingle, well known for the introduction of new plant materials; and many others. Various chapters (Test Tube Magic, The Bugs Crawl Out, All Flesh is Grass, Men on Wheels, Science at the Milk Pail) take us through all the branches of scientific research fostered in the department and impress on us the thousands, even millions, of dollars saved by such researches.

Indeed, if any criticism can be made of the book it is only to deprecate mildly the almost boyish enthusiasm of the author for his subject. (After all, science and the Department have a few failures against them also.) But such a minor protest is not meant to detract from the book's real interest and from the painstaking labor with which the vast mass of detail was compiled.

H. W. RICKETT.

Grain Crops Throughout History

THE CEREALS AND CIVILIZATION. Clark Wissler. 63 pages, illustrations, bibliography. American Museum of Natural History, New York, 1948. $1.29.

That cereals and civilization have been closely related throughout history is appreciated by most students beyond sixth grade. In this brief book are gathered together facts from far beyond written history to the present which demonstrate how and to what extent cereals and civilization have affected each other. While the author dwells briefly on all the cereals, their origin, culture and uses, the main emphasis is on wheat which is the bread cereal, rice which feeds the most people, and corn or maize which is the most important cereal in the modern livestock industry. The place of animal husbandry in the above relationship is also discussed.

The many good sketches and photos help greatly to emphasize the written material. This book can provide an interesting and informative evening's reading for anyone.

J. C. ANDERSON,
Rutgers University.

By Amateurs, For Amateurs

THE STORY OF PLANTS. John Asch. 407 pages, illustrated, indexed. G. P. Putnam's Sons, New York, 1948. $5.

OUR PLANT FRIENDS AND FOES. William Atherton Dupuy. 290 pages, illustrated, indexed. The John C. Winston Co., Philadelphia. Second edition, 1948. $1.52.

There is probably no science or subject which demands professional knowledge for its correct interpretation to the extent that botany does. It is seldom that one finds a popular presentation that is faultless . . . unless it is done by a professional botanist, who, on his side, is likely to err with too much technicality in the interest of accuracy.

The two books being reviewed here have both been written by and for laymen. Mr. Asch has attempted to give the reader without botanical background

an insight into the intricacies of plant science. Mr. Dupuy, on the other hand, has limited himself to a popular discussion of a number of economic plants, introducing technical discussion only incidentally — but often effectively. The plants in both books, as in most popular writings of non-botanists, are endowed with such attributes as power of reasoning, memory, and emotions. The advanced layman is likely to feel impatient or resentful of this juvenile approach.

Both books contain inaccuracies of a sort that would not have escaped the eye of a trained scientist. Mr. Dupuy gives an incorrect function for the cambium; Mr. Asch contradicts himself on two successive pages in explaining the workings of the stomata. And there are other errors which the publishers, if not the authors, should have caught. Nevertheless, Mr. Dupuy's book can be recommended for teen-age young people. In Mr. Asch's book I found his chapters on plant cultivation and exploitation of greatest interest.

The aim of both these books is laudable. They will probably serve their purpose best if they arouse sufficient interest in the important science of botany to carry a few readers into wider reading of greater accuracy.

RICHARD S. COWAN.

Technical and Text Books

THE STUDY OF PLANT COMMUNITIES. Henry J. Oosting. 389 pages, illustrated, indexed. W. H. Freeman & Co., San Francisco, 1948. $4.50.

An abundance of good photographs enlivens this text, which, in a dozen chapters, takes up the plant community, factors controlling it, community dynamics, and the practical aspects of plant ecology.

THE WATER-SOLUBLE GUMS. C. L. Mantell. 279 pages, illustrated, indexed. Reinhold, New York, 1947. $6.

Charts, graphs, and chemical formulas occupy much of this book, which is essentially for the technical worker or manufacturer. The large majority of the gums are derived from plants, some from the sap of trees, others from seaweeds, lichens, roots, seeds and seed pods, other fruits, and cellulose.

SOIL MECHANICS. Donald W. Taylor. 700 pages, illustrations, references, index. Wiley, New York, 1948. $6.

SOIL MECHANICS: Its Principles & Structural Applications. Dimitri P. Krynine. 511 pages, illustrated, indexed. McGraw-Hill, New York, 1948. $5.50.

Highly technical volumes, these two books may have an occasional practical use for the gardener or landscape architect, particularly if he needs to know how the structure of soil can affect its permeability by water, or if he needs to know the weight of a given type of soil to be used in a roof garden.

GENERAL BOTANY LABORATORY BOOK. Edward M. Palmquist & Loren C. Petry. 174 pages, diagrams, glossary. W. B. Saunders Co., Philadelphia, 1947. $2.25.

This is a large, easily handled loose-leaf guide for students, written by two well known botanists.

HEREDITY. A. Franklin Shull. 311 pages, illustrated, indexed. McGraw-Hill, New York. Fourth edition, 1948. $4.

A text book dealing principally with animal life, except for the chapter headed Applied Genetics, which is concerned chiefly with agricultural crops. A 13-page appendix takes up quantitative characters, with tables and mathematical formulas.

For Young Artists

DRAWING FLOWERS. Victor Perard. 64 pages. Pitman Publishing Corp., New York, 1948. $1.

Each page of this useful book for young artists contains a pencil sketch of a different type of flower with a few lines of penciled text to tell something interesting about the plant and to give notes on how it can be drawn most effectively.

Notes, News, and Comment

Scholarship. Leo Koch, a graduate student at the University of Michigan, spent the month of January at the New York Botanical Garden on a scholarship, studying the mosses of California in the Underwood herbarium.

Representative. Selected by the National Research Council to attend the Seventh Pacific Science Congress in

New Zealand Feb. 8-22 as a botanical delegate, Dr. F. R. Fosberg will also be the official representative of the New York Botanical Garden at the Congress.

Landscaping Course. The class in "Designing the Home Grounds" taught by Alice L. Dustan during the autumn and early winter will be repeated on Thursday afternoons in a term of ten weeks beginning Feb. 10. Each class period will last from 2:30 to 4:30. Opportunity will be given for students to make designs for their own properties and to have class discussion and professional criticism of their plans. The class will be limited to 25 students.

Advisory Council. New officers of the Botanical Garden's Advisory Council, elected at its annual meeting on December 2, are as follows: Mrs. Thomas D. Thacher, Chairman; Mrs. Guthrie Shaw, First Vice-Chairman; Mrs. Charles Burlingham, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Philip B. Weld, Corresponding Secretary; Mrs. Junius A. Richards, Treasurer. This will be the first term of office for the entire slate.

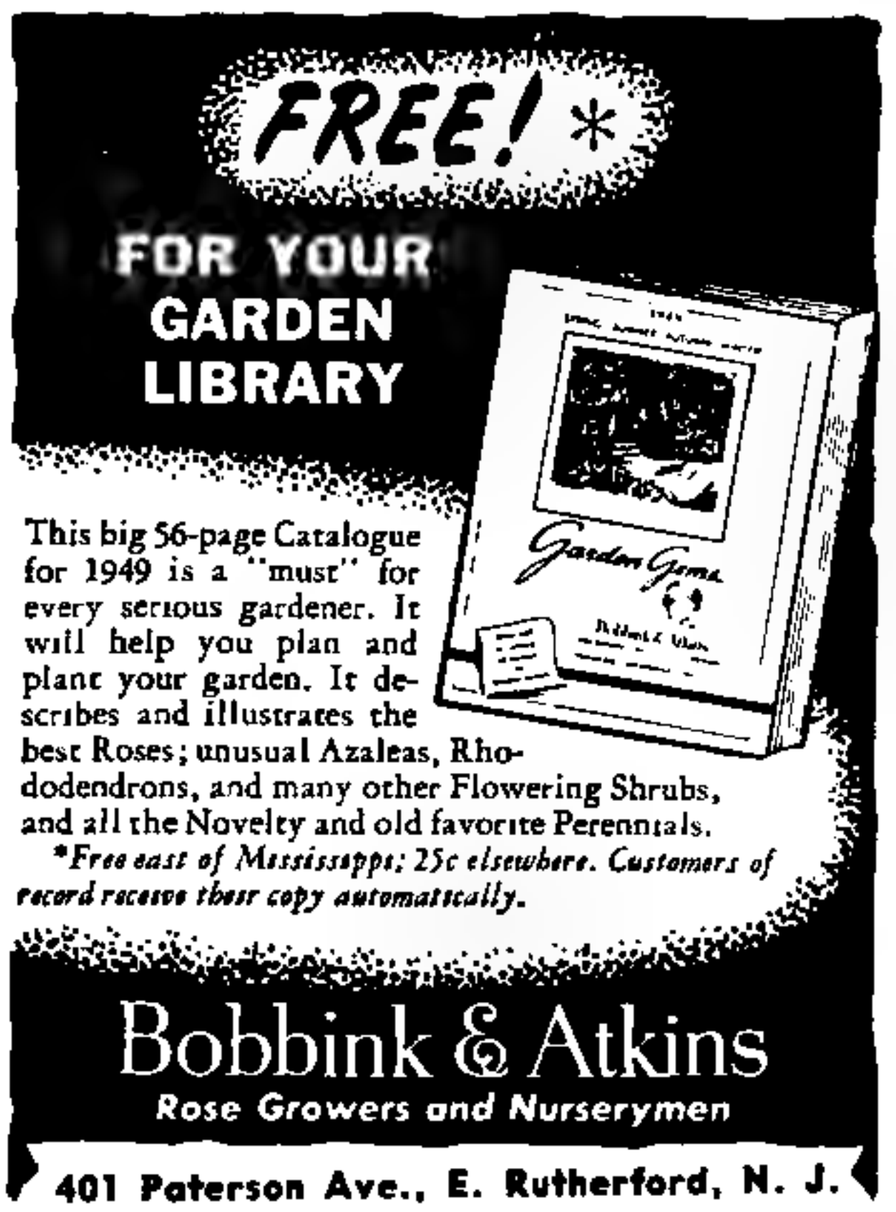
Growth Conference. Dr. William J. Robbins attended a meeting of the Botany Panel of the Committee on Growth, acting for the American Cancer Society (National Research Council) at Harvard University on Dec. 1.

Neurosporologists. Only scientists and graduate students working on the genus *Neurospora,* and their wives, were invited to the dinner given for Dr. B. O. Dodge at California Institute of Technology Nov. 19, when he was in California to give a report on cytogenetical studies of lethal complexes in this genus at the meeting at the National Academy of Sciences in Berkeley. Among those present were Dr. G. W. Beadle, who arranged the affair, with Mrs. Beadle, J. R. S. Finsham, a graduate student from England, Dr. Sterling Emerson, Professor at the Institute, with Mrs. Emerson, who is a research assistant there; Dr. H. K. Mitchell, Senior Research Fellow; Dr. N. H. Horowitz, Associate Professor; and Bernard O. Strauss, a graduate student who formerly did some work at the New York Botanical Garden.

Staff Conference. Dr. F. J. Seaver was both guest of honor and principal speaker at the monthly conference of the staff and students of the Garden Dec. 16. He gave informal reminiscences of his 40 years at the New York Botanical Garden. Preceding his talk, Dr. Donald P. Rogers told of Dr. Seaver's contributions to American mycology during these years.

Orchid Paintings. The sixty water colors of *Cattleya* hybrids, which occupied the rotunda of the Museum Building during January, are the work of Dr. Andrey Avinoff, Director Emeritus of the Carnegie Museum of Pittsburgh, from where he retired in 1945. He had previously been Professor of Art and Professor of Biology at the University of Pittsburgh.

The paintings shown are part of a collection of 120, of which 100 are to be published in full color and life size, according to plans now under way. All are hybrids whose genealogy is a matter of record; a few are so new that their names have not yet been registered. One bears the name of Dr. Avinoff himself.



Another belongs to the group to which the name *Potinara* has been given as a generic name in place of the four genera which should properly be combined in the names — *Cattleya, Brassavola, Laelia,* and *Sophronitis.* The orchid shown is a large flower of pink, apricot, and ivory tones with a fringed lip, one of approximately 40 hybrids in this quadri-generic group.

Visitors. Estella Garcia, secretary-assistant to Dr. Henri Pittier of the Ministerio de Agricultura y Cria, Caracas, Venezuela, spent four days in the Garden's herbarium during December, working on the genera *Solanum, Cyphomandra, Lycianthes, Chamaesaracha* and *Sloanea* for Dr. Pittier. Before coming here she spent four months at the Smithsonian Institution, and left for Caracas by plane upon completion of her work in New York.

Wilbur H. Duncan from the University of Georgia spent the New Year week-end at the Garden investigating ecological aspects of some of the regional flora of the southern states.

Margery S. Anthony of Englewood, N. J., a graduate student at the University of Michigan, worked on specimens of *Opuntia* in the herbarium Jan. 4.

Dr. Carl Skottsberg was at the Garden Jan. 7, with his daughter, on his way from Sweden to the Pacific Science Congress in New Zealand.

Among other visitors were T. Abraham Koshy of the Agricultural Institute, Allahabad, India; Dr. Charles Thom, Port Jefferson, N. Y.; Dr. Caryl P. Haskins of Haskins Laboratories; Dr. Ray Dawson, Columbia University; Dr. A. B. Hatch of Bristol Laboratories, Syracuse; Manfred Wahl, Germantown, Pa.; Dr. Ramsay Spillman, New York City; Anita Morgan, Valparaiso, Chile; Berthe Delaford, Paris; Lafayette Frederick, Rhode Island State College; and Helene Carter, artist, of New York City.

Lectures. Recent lectures by members of the staff included "Treasures of the Watchungs" by Dr. H. N. Moldenke at the Bound Brook Garden Club, Jan. 7; "Plant Collecting in Mexico" by E. J. Alexander at the Watnong Garden Club Jan. 10; "The Families of Garden Plants" by Dr. H. W. Rickett at the Green Fingers Garden Club Jan. 11; "Wild Flowers for our Gardens" by E. J. Alexander at the Essex Fells Garden Club Jan. 21.

Williamsburg Program. The third annual Garden and Flower Symposium of Colonial Williamsburg is to take place from Feb. 28 to Mar. 4 at Williamsburg, Va. Among the speakers will be Richardson Wright, Editor-in-chief of *House and Garden* magazine, and a member of the Corporation of the New York Botanical Garden, with a talk on "The Place of Small Gardens in Your Life." Other addresses on the program will be "Historical Restorations in the United States," by Thomas J. Wertenbaker, former president of the American Historical Association; "Colonial Garden Design in New England," by Professor Bremer Pond, head of the Department of Landscape Architecture at Harvard; "Colonial Garden Design in Virginia," by Alden Hopkins, resident landscape architect of Colonial Williamsburg; and a comparison between flower arrangements of the 18th century and today by Mrs. John R. Fisher, creator of flower arrangements for Colonial Williamsburg, and Mrs. F. F. Merriam, of Mountain Lakes, N. J., an expert on modern styles of floral decoration.

Honor. Dr. E. D. Merrill, former Director of the New York Botanical Garden, now Director Emeritus of the Arnold Arboretum, has been made an Officer in the Netherlands Order of Orange Nassau "in recognition of his contributions to the knowledge of the Malaysian flora, his stimulating interest in Dutch and Indonesian botany, and his efforts to promote international co-operation in botany."

Advisory Council. Mrs. Thomas J. Watson of New York City was elected to the Garden's Advisory Council at a meeting of the executive committee of the Board of Managers Nov. 9.

Algae Exhibited. The Garden's collection of ornamental algae, which was on view in the rotunda of the Museum Building late last winter, went to the Rochester Museum of Arts and Sciences for an autumn exhibit there, after having spent the summer as the special display at the Garden Club of America's headquarters at the Hotel Madison.

THE NEW YORK BOTANICAL GARDEN

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

PUBLICATIONS OF THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

An Illustrated Flora of the Northern United States and Canada, by Nathaniel Lord Britton and Addison Brown. Three volumes, giving descriptions and illustrations of 4,666 species. Second edition, reprinted. $15.

Flora of the Prairies and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex by K. K. Mackenzie. From Vol 19, Part 1, of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marion A. & G. L. Wittrock in the Journal for March 1942. 15 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal, 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 15 cents.

The Flora of the Unicorn Tapestries by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second edition 1947. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at the New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts by E. J. Alexander. 64 pages, indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. 50 cents.

Review of Juniperus chinensis, et al by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.

Periodicals

Journal of The New York Botanical Garden, monthly, containing news, book reviews, and non-technical articles on botany, exploration, and horticulture. $1.50 a year; single copies 15 cents. Free to members of the Garden. Now in its 50th volume.

The Garden, a quarterly, designed to stimulate the laymen's interest in the world of plants and the science of plant life through articles written in popular vein. $2 a year in the United States; all other countries, $2.50. Published by the Garden's Manhattan office at 801 Madison Avenue, New York 21, N. Y. Now in its first volume.

Addisonia, devoted exclusively to colored plates accompanied by popular descriptions of flowering plants; eight plates in each number, thirty-two in each volume. Now in its twenty-second volume. Published irregularly. Subscription price, $10 a volume. Not offered in exchange. Free to members of the Garden.

Mycologia, bimonthly, illustrated in color and otherwise; devoted to fungi, including lichens, containing technical articles and news and notes of general interest. $7 a year; single copies $1.50 each. Now in its forty-first volume. Twenty-four Year Index volume $3.

Brittonia. A series of botanical papers published in co-operation with the American Society of Plant Taxonomists. Subscription price of volumes 1 through 5, $5 a volume ($4 to members of the Society). Now in its seventh volume. Price, $7.50 ($5 to members of the Society).

North American Flora. Descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 97 parts now issued. Not offered in exchange. Prices of the separate parts on request.

Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

Memoirs of The New York Botanical Garden. A collection of scientific papers, 1900-1927. Contents and prices on request.

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

MARCH
1949

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WILD FLOWERS

HOW PANAMA
HATS ARE MADE

TWO SHRUBS FOR
NORTHERN
GARDENS

KINGDON-WARD
EXPEDITION
IN ASIA

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THE COVER PICTURE:

HISTORIC ROSE DESIGN
IN TEXTILE REPRODUCED
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PAGES 49—72

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MARCH AND EARLY APRIL EVENTS AT THE GARDEN

Free Saturday Programs

3 p.m. in the Lecture Hall

Mar. 12 ***Recognizing Trees at a Glance*** — *J. J. Levison*, Arboriculturist

Mar. 19 ***From Popayán to the Rio Putumayo*** — *Victor Wolfgang von Hagen*, Explorer and Author

Mar. 26 ***Maple Sap to Maple Syrup***—A motion picture program

Apr. 2 ***Insects to Look for in Your Garden This Year*** — *P. P. Pirone*, Plant Pathologist

Apr. 9 ***Botanical Rambles around New York*** — *Martin Weiss*, Bronx High School of Science

Courses of Study

Field Botany 7 sessions on Saturdays, 1:30-3 p.m., totaling 15 credit hours of work
Apr. 16—May 28, 1949 — Fee—$5; to teachers, $2.50. Single trip—$1
Instructor: *Mr. G. L. Wittrock*

Indoor Gardening Practice 8 sessions on Thursdays, 7-8:45 p.m. $15
Apr. 21—June 9, 1949 — Instructor: *Mr. Joseph W. Tansey*
Open only to those who have successfully completed the winter term in Cultivation of Greenhouse Plants

Garden Construction 8 sessions on Tuesdays, 7-8:45 p.m. $10
Apr. 26—June 14, 1949 — Instructor: *Mr. A. C. Pfander*

Members' Day Program

3 p.m. in the Members' Room

Apr. 6 ***Fungus Plants as Friends and Foes*** — *Dr. Donald P. Rogers*, Curator

Conservatory Displays

Flowering plants will continue to be displayed in the Conservatory, the season culminating in the Easter show to open April 15. Permanent displays are on view the year around, the Conservatory remaining open until 4 p.m. daily, or 4:30 after daylight saving begins.

Museum Exhibits

Until April 5 there will be an exhibit of "The Symbol of the Rose in Textile Design" from the Scalamandré Museum of Textiles.

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JOURNAL

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CAROL H. WOODWARD, Editor

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Wild Flowers of Our Coastal Lands

By E. J. Alexander

IS it a strange idea to go plant-hunting at the seashore, or does it call you to a renewal of pleasures known and proved? If it is strange, come with me on a seasonal tour; or, if the shoreline flowers are old friends, come for the sake of reminiscence, and see how the coastal lands pass through the flowering months.

New Yorkers we are, so we will naturally turn eastward in our search for seaside flowers—eastward to Long Island with its wide sandy stretches and swamplands, its dunes and brackish marshes, its clay bluffs along the north shore, its salt marshes, and its two distinctive kinds of salt beaches, bayside and oceanside.

How early does the flowering season start? It seems as if the tempering influence of the sea ought to bring spring there before it reaches the colder inner woodlands, meadows, swamps and fields. The uninitiated may be astonished to learn that, on the contrary, spring arrives a month or more later at the seashore than it does inland.

It is well into May before the beach plum, first of the coastal floral parade, bursts into its spring glory, scattering white clouds over the inner dunes and sea-facing hills. Not far behind, a little further in from the shore, a yellow haze hangs over the sassafras. In swamps the red maple and spice-bush are feeling the urge, and on dry hills and flats, the bayberry and sweetfern are hanging out their yellowish tassels to vie with the alders and willows of the swamplands. In the central woods, the dogwood and shadbush display their papery white banners. While violets, white and purple, lift their faces at the edges of marshes or in nearby woods, less showy flowers appear on other shrubs and trees: scrub oaks and pines, elm trees and poplars; and the fresh spring green of young foliage tints many a drab area of scrub and pineland. It is in these same regions that the trailing arbutus opens its pink and white blossoms, and their fragrance, caught up by the passing winds, lures you to its source.

The opulence of color that marks these coastal areas first becomes evident in June. Where the beach plums have scattered their white petals, the ground is now sheeted with the gold of the beach-heather; a little further inland and on sandy stretches of the bays, the pine-barren heather likewise turns the land into magic carpets of gold. The pasture rose blooms on the drier hills, and trilliums, bellworts and anemones adorn the woods and swamps. Through the drier areas and even in the cinder-scarred ditches beside railroad embankments are the pink slippers of the moccasin flower. Along roadsides the black locust hangs its pendent white sprays of luscious fragrance; in woods and meadows the wild geranium holds up its lavender-pink blooms. The woods and swamps are decorated with the white and yellowish bells of the blueberries and huckleberries. On the beach the great mounds of succulent leaf and stem of the beach sandwort are dotted with little greenish stars of bloom. The tiny seedlings of the sea-rocket start their life cycle, and the vines of the beach pea are in bud. The gray leaves of the dusty miller have taken on a fresh glint, and the silver-frosted leaf-rosettes of the sea-poppy show a stirring into new life. On the inner stretches of sand the bird's-foot violet spreads its lilac bloom over wide areas, they in turn overtopped by fallen sky fragments of lupine. Over dry hillsides are scattered golden cups of the frostweeds and sundrops, with drift after drift of the purple-pink spikes of milkwort intermingled with the white fleece of the pine-barren sandwort. In sandy swamps and moist hollows the butterfly-like blossoms of the slender blue flag are poised on delicate stalks. Occasionally, among fallen boulders at the foot of the clay bluffs or even between the dunes, the great purplish-pink blooms of the rugosa rose stud thorny bushes. Native of far-off China, this shrub has here found a second home.

Midsummer Mélange

July brings a riotous variety. In the swamps rise the tall spires of the white-fringed orchis, and not far away the green plumes of its ragged-fringed sister. Below them the snake-mouth pogonia shows its pink fangs, and yellow flowers of the bladderworts rise from the mud or from floating blobs of green on the water. The gray heads of pipewort, hatpin-like, stand up from the shallow water, where also rise the fat necklaces of flowers of the bur-reeds. Now the swamp rose blooms, and the swamp azalea spreads its white funnels and spicy perfume on the air. More humble in the open sandy swamps are the delicate flower-spikes of the thread-leaved sundew, the pink flowers accompanied upward by the uncoiling and uncoiled slender leaves that are sprinkled with glistening red glands, death traps for unwary insects. Nearby or intermingled with the sundews arise the more spectacular, deeply colored flowers of the grass-pink.

White waterlilies float upon the surface of ponds and sluggish streams along whose swampy shores the skullcaps display their lavender-blue flowers.

THE DUNES BACK OF JONES BEACH, LONG ISLAND

Pitch pine (*Pinus rigida*), the only native conifer found so close to the sea, is prominent here. Beach-heather, which makes a golden carpet in June, is the principal ground cover. (Photograph by Gottscho-Schleisner.)

On the beaches where the dusty miller has now sent up its tall stalks of dull greenish-brown bloom, the fragile orange petals of the sea-poppy are spread to the morning sun, to fall at the slightest touch. The beach pea is now in its full glory of purple sweet-pea-like blooms, and the sea-rocket starts to open its pale lavender crosses. This annual plant must make fast growth into flower and seed, for it is the hardiest adventurer of the flowering plants into the storm-lashed stretches of the beach where no other of its kingdom has been able to gain a foothold—yet here in this most unstable and unfriendly habitat it passes its entire life span, apparently by preference. Close on its heels follows the little seaside spurge, just now beginning to spread its tiny green mats on shore and dune. The humble pinweeds now are in flower on interdune areas, in open woodlands and on sand flats, forming scattered masses of brownish, powdery-looking growth made up of their copious, tiny flowers.

Evening-primroses flaunt their yellow banners to the winds on summer evenings, and the woolly gray rosettes of mullein have sent up their six-foot rods studded with yellow flowers which emerge from furry gray caps. Purple thistles of many kinds adorn the fields with their feather dusters, and on the sandy plains are the great straw-yellow heads of the pine-barren thistle. Among these the pink and yellow pea-flowers of the cat-gut or devil's-shoestring top silvered masses of feathery leaves. In the sandy fields the butterfly-weed flaunts its brilliant orange flowers to draw winged guests to a nectar feast. Where the ground is moist stand the stalked candelabra of wild lilies and the soldier-like ranks of the colic-root, each slender stem dotted on its upper portion with little horizontal mealy white bells.

Damp grasslands are studded with the six-pointed stars of blue-eyed grass, their faces looking into the morning sun. In still wetter or even in muddy places appear large patches of bright gold. Since the beach-heathers do not linger in flower into July, what can they be? Seek closer contact at the expense of muddy feet and legs and you will find the answer—little yellow funnels of the golden hedge-hyssop. Nearby in swampy stretches and on stream-sides the white balls of the buttonbush stand out stiffly to offer their nectar-fare to the insect world, and around their feet are the pale flesh-pink flowers of the marsh St. Johnswort half-hidden among its red-tinged leaves. Its golden-flowered sisters (even the naked-looking orange-grass is one of their number) form dominant splashes of yellow over field and hillside. Most startling of all, however, are the large golden chalices of the prickly-pear, sole member in our region of an otherwise desert-inhabiting group of plants, the cacti. On Long Island it occurs in many places—on open sand plains and flats, on hillsides among the pine-barren heathers, or by itself, in hollows between the dunes, on beaches above high-water mark, and even in brackish marshes where it sometimes occurs in great mats among the marsh grasses and shrubs.

August to Autumn

For full appreciation of Nature's abundance of gold, pink and purple one must visit the coastal areas, however, in August, for in that month the wealth of color finds its height of development. Mile after mile of golden-rod of many kinds may be seen swaying in the breeze on hillside and in field, along the beach and in salt marshes, where that finest of the clan, the seaside goldenrod, holds sway over a riot of rose-purple gerardias. Lower-growing sweeps of gold are formed by the two kinds of golden-aster, then interspersed with this monotony of color are frequent drifts of the purple, lavender and white of a dozen kinds of aster. Especially beautiful among them is the New England aster, tallest and most splendid of its kind, occasionally pink or white, but normally of a rich violet with dark yellow or reddish center.

CHERRY BLUFFS ON GARDINER'S ISLAND IN PECONIC BAY

The tufts of vegetation which end in an even line at high tide mark are beach grass (*Ammophila breviligulata*). (Photograph by Gottscho-Schleisner.)

The little white spires of the nodding ladies' tresses stud the meadows among tussocks of hardhack whose deep pink plumes rise over dark green and tan foliage. Purple javelins of blazing star are shaken by the wind; the magenta-pink of fireweed stands steeple-like over the burned areas, and in the shallow water of lake and stream rise the blue-purple candles of pickerel-weed alongside the white of the arrowhead. The flat-topped sprays of the bonesets and stiff white asters form undulating miles of open field and swamp, the dome-shaped, dusty pink masses of Joe-Pye-weed rising above them. Over otherwise barren reaches of sand hang fleecy mists of jointweed.

Through the salt marshes and salt flats drift clouds of sea-lavender, and salt meadows are sheeted with great expanses of sea-pink, whose deep rose-colored flowers with red-banded yellow eyes are worth a close acquaintance. Largest of our wild flowers, the great rose-mallow flaunts its blossoms over swamp muck and above waving seas of grassy marsh. Where the swamps are less salty, the two lobelias, the great blue and the gorgeous cardinal-flower, flash like beacons above the dark waters in which they stand. Sev-

eral kinds of perennial sunflower rise like many-armed giants above their neighbors, their radiant golden heads flung in defiance to the autumn winds. Most beautiful of them is an inhabitant of the brackish marshes of the south shore, the narrow-leaved sunflower, whose slender, dark green leaves, red stems and brown-centered heads with orange rays make them a worthy garden subject. Frequently with them are seen the tall greenish-white wands of the American burnet, the fat brown spikes of the cattails, and the great silver plumes of the giant reed. Sometimes the stems of the swamp plants are all bound together by the twisting and entwining stems of the climbing hempweed, these in turn studded with clusters of dull pink flowerheads.

But after mid-September a hush comes over the landscape; the plants are busily forming seed to insure future generations of their kind and to feed migrating birds, who will help these seeds to invade new areas. The flower colors fade into browns and grays, and then about the end of the month comes the final blaze of glory. The heads of the composites burst into feathery pompons of white and gray, huge plumes of silver appear on the giant reed and the groundsel-bush; dogwood berries turn blue, white or red, each according to its kind, luscious heads of elderberries hang laden with fruit, red rose-hips dot the meadows and swamps, orange and red hang the clusters of bittersweet, dark purple and black wild grapes tempt one into the thickets, beach plums hang purple from their branches, bayberries take on their winter frosting of gray, and winterberries brighten the wooded swamps. Strong winds sweep the sandy plains and grassy marshes, the roar of the sea grows more angry and its waters take on colors of gray and brown as they lash the shores. The hardy sea-rocket is torn to pieces by the gales, but not before it has formed its fat seed-pods to insure next year's generation. Then great blazes of red, yellow and orange appear over the landscape, interspersed with browns, smoky purples, grays, and even some lingering greens. The days of autumn color have arrived, those days for which eastern North America is famous over the world. Then frost strikes, and almost overnight the color is gone except at the shore. In the salt marshes the glasswort turns into a sanguine carpet, and on the beaches the saltworts and sea blites likewise become a bloody symphony to sound the death-knell of the growing season. The cattails take on a rich chocolate color, which is finally torn into masses of creamy wool to float with the winds, which with increasing violence sweep the last seeds from their stalks and the last lingering leaves from their branches, and roar a lullaby which carries all nature into its winter sleep.

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PLANTS OF COASTAL AREAS IN THE REGION OF NEW YORK

LISTED below, alphabetically by common name, are all the plants mentioned in the article by E. J. Alexander on pages 49 - 54. The botanical names are mostly in accordance with "Gray's Manual of Botany," but where other names have superseded these and become well established in common parlance among botanists, the names from Gray are added in parentheses. The abbreviation "spp." stands for *species,* in the plural, and is used when more than two species of a genus are referred to in the article.

While this is by no means a complete list of the plants of the New York beaches and adjacent lands, it represents about 100 of the more conspicuous plants, from among which selections were made for the exhibit of seaside flora staged by the New York Botanical Garden at the International Flower Show in Grand Central Palace, New York, March 21 - 26, 1949.

Common Name	*Botanical Name*	*Family*
ALDER	*Alnus rugosa*	Birch (Betulaceae)
ANEMONE	*Anemone quinquefolia*	Buttercup or Crowfoot (Ranunculaceae)
ARBUTUS, TRAILING	*Epigaea repens*	Heath (Ericaceae)
ARROWHEAD	*Sagittaria* spp.	Water-plantain (Alismaceae)
ASTER	*Aster* spp.	Composite (Compositae)
—, NEW ENGLAND	*A. novae-angliae*	
—, WHITE	*A. umbellatus*	
AZALEA, SWAMP	*Rhododendron viscosum*	Heath (Ericaceae)
BAYBERRY	*Myrica carolinensis*	Sweet Gale (Myricaceae)
BEACH-HEATHER	*Hudsonia tomentosa*	Rockrose (Cistaceae)
BELLWORTS	*Uvularia perfoliata* and *U. (Oakesia) sessilifolia*	Lily (Liliaceae)
BITTERSWEET	*Celastrus scandens*	Bittersweet (Celastraceae)
BLADDERWORTS	*Utricularia* spp.	Bladderwort (Utriculariaceae)
BLAZING STAR	*Liatris* spp.	Composite (Compositae)
BLUEBERRIES	*Vaccinium* spp.	Blueberry (Vacciniaceae)
BLUE-EYED GRASS	*Sisyrinchium* spp.	Iris (Iridaceae)
BLUE FLAG, SLENDER	*Iris prismatica*	Iris (Iridaceae)
BONESETS	*Eupatorium* spp.	Composite (Compositae)
BURNET, AMERICAN	*Sanguisorba canadensis*	Rose (Rosaceae)
BUR-REEDS	*Sparganium* spp.	Bur-reed (Sparganiaceae)
BUTTERFLY-WEED	*Asclepias tuberosa*	Milkweed (Asclepiadaceae)
BUTTONBUSH	*Cephalanthus occidentalis*	Madder (Rubiaceae)
CARDINAL-FLOWER	*Lobelia cardinalis*	Lobelia (Lobeliaceae)
CATGUT—See Devil's Shoestring		
CATTAILS	*Typha latifolia* and *T. angustifolia*	Cattail (Typhaceae)
COLIC-ROOT	*Aletris farinosa*	Lily (Liliaceae)
DEVIL'S SHOESTRING	*Tephrosia virginiana*	Bean (Leguminosae)
DOGWOOD	*Cornus florida* also other species	Dogwood (Cornaceae)

Common Name	*Botanical Name*	*Family*
DUSTY MILLER	*Artemisia Stelleriana*	Composite (Compositae)
ELDERBERRY	*Sambucus canadensis*	Honeysuckle (Caprifoliaceae)
ELM	*Ulmus americana*	Elm (Ulmaceae)
EVENING PRIMROSE	*Oenothera biennis*	Evening-primrose (Onagraceae)
FIREWEED	*Epilobium angustifolium*	Evening-primrose (Onagraceae)
FROSTWEEDS	*Crocanthemum (Helianthemum) canadense* and *H. majus*	Rockrose (Cistaceae)
GERANIUM, WILD	*Geranium maculatum*	Geranium (Geraniaceae)
GERARDIAS	*Gerardia purpurea* and *G. maritima*	Figwort (Scrophulariaceae)
GLASSWORT	*Salicornia* spp.	Goosefoot (Chenopodiaceae)
GOLDEN-ASTERS	*Chrysopsis mariana* and *C. falcata*	Composite (Compositae)
GOLDENROD	*Solidago* spp.	Composite (Compositae)
—, SEASIDE	*S. sempervirens*	
GRAPES, WILD	*Vitis* spp.	Grape (Vitaceae)
GRASS PINK	*Calopogon pulchellus*	Orchid (Orchidaceae)
GROUNDSEL-BUSH	*Baccharis halimifolia*	Composite (Compositae)
HARDHACK	*Spiraea tomentosa*	Rose (Rosaceae)
HEDGE-HYSSOP, GOLDEN	*Gratiola aurea*	Figwort (Scrophulariaceae)
HEMPWEED, CLIMBING	*Mikania scandens*	Composite (Compositae)
HUCKLEBERRIES	*Gaylussacia* spp.	Blueberry (Vacciniaceae)
JOE-PYE-WEED	*Eupatorium purpureum*	Composite (Compositae)
JOINTWEED	*Polygonella articulata*	Buckwheat (Polygonaceae)
LADIES' TRESSES	*Spiranthes cernua*	Orchid (Orchidaceae)
LILIES	*Lilium superbum* and *L. canadense*	Lily (Liliaceae)
LOBELIA, GREAT BLUE	*Lobelia siphilitica*	Lobelia (Lobeliaceae)
LOCUST, BLACK	*Robinia Pseudo-Acacia*	Bean (Leguminosae)
LUPINE	*Lupinus perennis*	Bean (Leguminosae)
MAPLE, RED	*Acer rubrum*	Maple (Aceraceae)
MILKWORT	*Polygala polygama*	Milkwort (Polygalaceae)
MOCCASIN-FLOWER	*Cypripedium acaule*	Orchid (Orchidaceae)
MULLEIN	*Verbascum Thapsus*	Figwort (Scrophulariaceae)
OAK, SCRUB	*Quercus ilicifolia* and other species	Beech (Fagaceae)
ORANGE-GRASS	*Hypericum gentianoides*	St. Johnswort (Hypericaceae)
ORCHIS, RAGGED-FRINGED	*Habenaria lacera*	Orchid (Orchidaceae)
—, WHITE-FRINGED	*H. blephariglottis*	
PEA, BEACH	*Lathyrus maritima*	Bean (Leguminosae)
PICKEREL-WEED	*Pontederia cordata*	Pickerel-weed (Pontederiaceae)
PINE	*Pinus rigida*	Pine (Pinaceae)
PINE-BARREN HEATHER	*Hudsonia ericoides*	Rockrose (Cistaceae)
PINWEEDS	*Lechea* spp.	Rockrose (Cistaceae)
PIPEWORT	*Eriocaulon septangulare*	Pipewort (Eriocaulaceae)
PLUM, BEACH	*Prunus maritima*	Rose (Rosaceae)
POGONIA, SNAKE-MOUTH	*Pogonia ophioglossoides*	Orchid (Orchidaceae)
POPLARS	*Populus* spp.	Willow (Salicaceae)
PRICKLY-PEAR	*Opuntia compressa (O. vulgaris)*	Cactus (Cactaceae)
REED, GIANT	*Phragmites communis*	Grass (Gramineae)
ROSE, PASTURE	*Rosa carolina*	Rose (Rosaceae)
–, RUGOSA	*R. rugosa*	
, SWAMP	*R. palustris*	
ROSE-MALLOW	*Hibiscus Moschcutos*	Mallow (Malvaceae)
ST. JOHNSWORT	*Hypericum* spp.	St. Johnswort (Hypericaceae)
—, MARSH	*H. virginicum*	

Common Name	*Botanical Name*	*Family*
SALTWORT	*Salsola Kali*	Goosefoot (Chenopodiaceae)
SANDWORT, BEACH	*Arenaria peploides*	Pink (Caryophyllaceae)
—, PINE-BARREN	*A. caroliniana*	
SASSAFRAS	*Sassafras albidum (S. variifolium)*	Laurel (Lauraceae)
SEA BLITES	*Suaeda* spp.	Goosefoot (Chenopodiaceae)
SEA-LAVENDER	*Limonium carolinianum*	Leadwort (Plumbaginaceae)
SEA-PINKS	*Sabbatia* spp.	Gentian (Gentianaceae)
SEA-POPPY	*Glaucium flavum*	Poppy (Papaveraceae)
SEA-ROCKET	*Cakile edentula*	Mustard (Cruciferae)
SHADBUSH	*Amelanchier canadensis*	Rose (Rosaceae)
SKULLCAPS	*Scutellaria galericulata* and *S. lateriflora*	Mint (Labiatae)
SPICEBUSH	*Lindera Benzoin (Benzoin aestivale)*	Laurel (Lauraceae)
SPURGE, SEASIDE	*Euphorbia polygonifolia*	Spurge (Euphorbiaceae)
SUNDEW, THREAD-LEAVED	*Drosera filiformis*	Sundew (Droseraceae)
SUNDROPS	*Oenothera* spp.	Evening-primrose (Onagraceae)
SUNFLOWERS	*Helianthus* spp.	Composite (Compositae)
SUNFLOWER, NARROW-LEAVED	*H. angustifolius*	
SWEETFERN	*Myrica asplenifolia*	Sweet Gale (Myricaceae)
THISTLES	*Cirsium* spp.	Composite (Compositae)
THISTLE, PINE-BARREN	*C. spinosissimum*	
TRILLIUMS	*Trillium erectum* and *T. cernuum*	Lily (Liliaceae)
VIOLETS	*Viola* spp.	Violet (Violaceae)
VIOLET, BIRD'S-FOOT	*V. pedata*	
WATERLILIES	*Nymphaea (Castalia) odorata*	Waterlily (Nymphaeaceae)
WILLOWS	*Salix* spp.	Willow (Salicaceae)
WINTERBERRY	*Ilex verticillata*	Holly (Aquifoliaceae)

Leatherwood for Early Spring Bloom

By James G. Esson

WHILE the leatherwood (*Dirca palustris*) will not appeal to the average home owner as an ornamental shrub, it is a woody plant of distinctive character, valuable for its early though inconspicuous bloom. On Long Island it flowers in gardens about April 15, or at the same time as the cornelian cherry (*Cornus mas*).

Native from southeastern Canada south to Florida and west to Missouri, the leatherwood, as its specific name of "palustris" implies, is found growing in damp soil, usually where there is some shade. However, it grows well in open ground, though it will more quickly reach its maximum height of 5 to 6 feet in filtered light.

The name "leatherwood" is a remarkably fitting one. It might be possible, by selecting twigs of suitable thickness, to use them as leather laces

AN EARLY-BLOOMING NATIVE SHRUB

Leatherwood, though an inconspicuous plant, is welcome because of its April bloom in northern latitudes.

for one's shoes, for the twigs can be twisted or tied into a knot without splitting. This is accounted for by the resistant fiber that constitutes the smooth, pale brown bark.

The habit of growth is upright, sometimes with a single stem, but often branching to form a flat-topped shrub. At the base of each year's growth is a swelling which gives the curious appearance of each year's growth being fitted artificially into the preceding one. Floral buds, which open before the leaves, are both terminal and lateral. The inflorescence is almost sessile and protrudes from yellow-green bract-like scales that are more conspicuous than the two or three florets which appear together within them. The pale yellow perianth is campanulate with eight prominent stamens stretching well beyond the funnel. The glabrous, somewhat obovate leaves, expanding immediately after the flowers, mature to about two and three-quarters inches long. The fruit is a red ovoid drupe about one-third of an inch long.

Leatherwood is easily raised from seeds sown in sandy peat that is kept constantly moist and protected in a cool greenhouse or coldframe.

Dirca palustris belongs to the Mezereum family (Thymelaeaceae) of which the more popular genus *Daphne* is a member. It might be a means of giving this native plant a higher standing among gardeners if it were grown as a contrast alongside *Daphne Mezereum*, whose bright purple flowers appear at about the same time of spring.

This article is the first of a series by Mr. Esson on deserving shrubs that are little used in American gardens. Mr. Esson is Editor of the Gardeners' Chronicle of America. Over many years he devcloped an outstanding collection of woody plants on the Long Island estate of Mrs. Roswell Eldridge.

Hats of Straw

A Chapter from "Ecuador and the Galápagos Islands"

By Victor Wolfgang von Hagen

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EVERY Thursday is marked as the day of the Panama Hat Fair. All the roads leading to Cuenca are alive with people. They come from corn fields and hamlets in the Andes, from the townships of Azogues, Biblián, Cañar, and remote sections of the provinces. Pure Indians—Zaragúros, Oñas, Cañari—mix with cholos and plod toward Cuenca and the fair.

The Indian women are dressed in skirts of violently clashing colors, full skirts of reds, blues, oranges, one over the other, sweeping a bare half-inch from the earth. The women look like animated tea cozies. No matter how loaded down they are with *tinajas* (jars) or rolls of mats made of lake reeds, they clutch by its straw ends a recently finished panama. The cholas—the other caste—are garbed in their best: skirts of a fine cloth, clean freshly pressed shirtwaists, and a *rebozo* of blue and white cloth, with eighteen inches of mesh at the ends and fringes equally long, thrown about the neck. Gleaming white panamas sit at a jaunty angle on their dark heads. Shod in leather pumps, they are careful to avoid the puddles. They carry their contribution to the straw-hat fair high up on their ample bosoms. Men, too, of all racial castes, jog along the roads, carrying their newly woven hats. And there are children.

Along the roads commission agents are stationed. They wear modern black felt hats and dark clothes—the perpetual mourning of Cuenca. Beside them are piles of hats which they have already purchased from the

incoming weavers. They are eager to buy hats of certain measurements, and their expert eyes pick out from the mass that moves by them the hat that fills these specifications. They call out to the weaver. He stops. They talk discursively; offers and counteroffers are hissed, without visible agitation, at one another. Most of the weavers have doubtlessly promised their product to a specific agent within Cuenca and, with a shaking of heads, they hurry on.

On days other than Thursday, Cuenca slowly yawns itself to work. On the fair day it is different. Shopkeepers are up betimes. Policemen in shaggy blue denims try ineffectively to keep a mass of people moving. The streets are closed to wheeled traffic. Along the vaulted narrow sidewalks, agents are busily buying panamas. From above the market it looks like a sea of white hats floating bodylessly in a confusing flow. By the time the sun has tinged the white buildings to a roseate hue, all the markets are in full operation; the hum of the conversation rises with the day in strident dissonance, like the incessant drumming of cicadas. The town swarms with Andean people, so much so that Cuenca expands on this day to three times its normal population. And in a single fair day not less than thirty thousand hats are purchased.

The panama is not produced, of course, in the Republic of Panama; the name was attached to this particular type of finely woven fibre hat because Panama was for years its distribution point. It is useless to try to change its name (Ecuadorians have suggested *"sombreros jipijapa"*); it will remain "panama." Another anachronism: 85 per cent of the hats are produced in the province of Azuay (more than half in the city of Cuenca alone) in regions 8,500 feet above sea level, where one never expects to see a straw hat. Even the *toquilla* fiber from which the hats are made is not a product of the sierra but of the hot humid coast where the craft industry first took root.

The province of Manta—particularly the centers about Montecristi and Jipijapa (hé-pe-há-pa)—is the original center of the finely woven straw known as panama. In that hot, arid littoral the *toquilla* palm is indigenous. It is a small stemless species six to fourteen feet high with fan-shaped leaves, four feet in diameter, having the deep indentations in the leaf of the family Cyclanthaceae. The natives call it *"paja toquilla."* Now, with the growth of the panama industry, whole plantations are given over to its culture. To convert it into fiber, the large green palm leaf is cut from the base of the tree, stripped of its outer filaments, thrown into boiling water, then set out to bleach under the equatorial sun. When sufficiently whitened, the straw is cut into small strands, which shrivel dry into slender cylindrical form. Cordlike in texture, they are over a yard in length.

Straw-hat making began in the colonial period. No Indian in these

regions—before he saw the white man ever wore a hat. The *toquilla* was used by the Indians to weave the finely meshed *petate* mats until some anonymous Spaniard, exhausted in his Renaissance ruff and felt hat, suggested that the Indians weave hats of the same *toquilla*.

From Manta come the hundred-dollar panamas, which most people gape at but do not buy. Because it is a cottage industry and its production is based on the part-time principle, the weaver will work for at least three months upon a hat which will be retailed at one hundred dollars (but which earns him between ten and thirty dollars). As Manta is hot and dry, the weaver will keep a gourd of water beside him to moisten the dessicated straw and keep it pliable. This is the source of the legend that the fine straw hats are woven under water. Although the weavers of Montecristi and Jipijapa produce the best hats, they do not produce the bulk; that distinction belongs to Cuenca.

How the panama came to Cuena no one precisely knows, but there is a legend. There had been threats of a revolution in Esmeraldas, and one of the presidents, remembering the manner in which the Inca transferred whole populations to distant parts, had General Molina move his regiments of *costeños* to Cuenca. Numbered among these strange unsoldierly shapes, barefooted and dark-skinned, were a number of soldiers from Manta. As it was their custom to weave panamas in their spare time (which is, as the Ecuadorians say, "*casi siempre*"), they sent for *toquilla* from the coast and began to weave hats. The practice spread. One by one the people of Cuenca took up the art. A market was created when hats were sent to England and Germany in 1880. And a trade was born. Now within a radius of forty miles there are over 200,000 hat weavers: children, adults, Indians, and cholos. This is a typical part-time industry —a clerk in a store will lay down his fiber-becoming-a-hat to attend to you, and pick it up again when you have left. Women sit in doorways gossiping while they dexterously flip the straws into place to make the panama. It is far better than the cup and ball to which Jean Jacques Rousseau used to resort when overcome with ennui. And many times more profitable.

Thus the hat industry is a cottage craft, guided by the hand of big business. There are no factories. Indian and cholo weavers have worked out an interesting compromise with the demands of business and the demand for mass production. It is one of the few cottage industries worked on a vast scale that answers quickly the demands for new styles. The system works in this manner:

A hat designer in New York creates for the coming summer a panama whose brim and crown are to be of certain dimensions. The hat is to be blocked in the manner that she ordains; that part will be done in New York. Contact is made with the Ecuadorian Panama Hat Company of

New York. A code message is sent over the cables and reaches, in short order, its representative in Cuenca. His commission agents, Spaniards or cholos of Cuenca, are advised of the new order some days preceding the Thursday Hat Fair. The agents in their spare time take their rulers and break off pieces of straw that represent the desired size of crown and brim of the special type of hat. These agents assemble in their usual buying places on fair day.

Let us follow an Indian on the road to Cuenca to find out exactly what happens to the panama hat from the time it is woven. He moves along toward the commission agents, who are stationed on one of the principal streets leading to the general market. A stack of hats, square crowned, with the overhanging straw fringe, are already piled before them one on top of the other. Our Indian waits his turn as a chola offers her hat to the *comisionista*. The man picks up the hat, measuring the crown and brim with a small rule he holds in his hand. He inspects the fibers, looks inside the hat, then makes an offer. The chola refuses the proffered price and asks a higher one. The agent lowers it by a few reales. Each in advance, agent and weaver, knows the price that will be paid. Custom determines the procedure, the weaver demanding twice the price he will eventually receive. Good-naturedly the harangue continues until they reach the price that each expected in the first place. The agent pays the weaver in cash and marks the price he has paid in the hat, and it follows the others to the pile beside him.

The Indian whom we have followed evidently has a finer hat. He refuses the offer of four sucres (thirty-five cents), and the agent, knowing that it is a superiorly woven hat, raises the price two reales; still our Indian is not satisfied. He trots off to another *comisionista*. They quickly reach terms, for this agent has an order to buy up the finer "straws." He pays six sucres for it. The agent who has made the purchase now takes our Indian aside and gives him pieces of broken straw, explaining, in Quechua, the type of hat that is now wanted. Since the Indian cannot read or write, written figures would mean nothing. The crown, represented by one straw, is to be so high, the brim, represented by another, is to be so wide. Does he understand? Yes, the Indian understands. The texture is to be of such and such fineness and for such a panama eight sucres will be paid. And will the Indian be sure and keep his hands clean and not weave with dirty hands? The dirt and perspiration soil the *paja* and it will not bleach out. Once more our Indian nods his head; he then repeats, holding up the shorter straw, "For the crown." The agent nods. He holds up the longer piece, "For the brim." The agent nods. And to confirm it all, the Indian reiterates. "Eight sucres." Now the Indian trots off to the market to buy *paja toquilla*.

The agent, meanwhile, is interviewing all the weavers whose work he knows. As this is a special order, the price is more than for the usual hat, and only the weaver whose work is of machinelike consistency can be relied upon. Ordinarily, the weavers do not like the special orders, nor do they like to weave American women's hats. The chola weaver complains that it is obvious that the women of the North must be of flighty mind. One year they want one type of hat, the next year another. They never seem to know what they want. Fashion is little known to the Indians. They have been wearing the same style of clothes for ten centuries.

Our Indian is now in the plaza buying his *paja* for the next week's hat. In an immense square, with the natives selling their foodstuffs in the center, row after row of Indian women are sitting on small woven *petates* behind their products. In one corner of the plaza are seated the vendors of the *paja*.

The straw is tied into bundles of ten strands, this being enough to make the ordinary hat. The Indian moves from bundle to bundle, examining, twisting the fibers, breaking off a small piece to see if it is brittle. This is important. If the *paja* breaks while he is weaving, a knot must be made, which, in a sense, will disfigure the hat, and the commission agent will use it next week as a pretext for paying a lower price. Finally he makes his purchases, pays the forty centavos for the straw, and saunters off toward the *cantina*, following the smell of fermented *chicha*.

By Friday morning the Indian has slept off his debauch of the previous night. Through it all he has been careful not to soil the straw, and although he may be brought home staggering, his subconscious mind has remembered to carry the *paja* carefully wrapped. By the time we see the new hat, part of the top circle of the crown is completed. All the straw that will form it is laid down, so to speak, in the traditional warp and woof of weaving. The weaving is held on the lap. With a twisting of the fingers, each fiber is woven and pulled tightly to form a concentrical pattern. In the spare time from planting corn, harvesting, and shelling beans during the next few days, the hat crown is finished. The Indian weaver carefully measures it at several angles with the piece of straw given him by the agent. By Wednesday the hat is ready, and once more on Thursday he is off to the market.

For this order the agent is more exacting; he takes the hat from the weaver and with his small rule goes over the whole crown and brim. He examines the inside, then makes the purchase.

After the fair, the hats are brought to the office of the exporter; here technicians carry the panamas into the final stage. The hats are trimmed and the edges bound; they now bear some resemblance to the finished product. They are then sent to the bleaching rooms, where they are placed on small racks very much resembling coat hangers. Under-

neath, sulphur is placed on small braziers, emitting the gagging whitish fumes that bleach the hats. For once, Ecuador's famed volcanoes are helpful. The panama hat industry consumes one thousand tons of sulphur yearly. The finishing touch in the bleaching that gives the hats a perfected whiteness is a bath in the milk of sulphur. Each hat is lavishly painted, as the operator rubs the suphur into it by whirling it in his hands, working the milk into the fibers. The hats are next given a final drying under the sun. They are then put on hat blocks and pounded with a large wooden mallet to smooth out all the imperfections of weaving, such as small knots which the weavers had made when the straw was broken. No panama may be said to be well woven when these are apparent.

Finally the hats are pressed with a charcoal-heated iron and cleaned with starch for spots which have not come out in the bleaching. Folded into the half-moon shape in which one buys them at the store, the panama hats are ready for shipment.

So much for the panama as an article of commerce. It has another function: its ameliorating effect on the life of the native. In Cuenca and its immediate environs, most of the Indians own their own piece of earth; their homes, white-washed, sun-baked brick, neatly red-tiled, are epics of cleanliness in comparison with the *huasipongos* of the majority of the other Andean dwellers. This is the result of the panama. Weaving can be done in odd moments by everyone in the family; every week the family can create a small capital to balance the subsistence crops raised on its own land. Change the scene, put yourself among the Indians working in a Bolivian tin mine in the treeless *puna;* they labor day after unchanging day in the mines and possess nothing. Their native cultures are fast disappearing. They are quickly forgetting all the finer things of their past; they have inherited only the dross of Western civilization. This process of deculturizing has made such rapid headway in the Americas that another fifty years may see the total eclipse of all these cultural elements. One by one these primitive communities are falling prey to the machine. What Cecilio Guzmán de Rojas has said of the cultural arts of Bolivia can apply, in like manner, to all Andean countries. "We in Indio-America are fortunate—the millions of Indians who form the majority of our population have never entirely lost their creative abilities . . . where popular arts are alive, no idleness exists and people are less inclined to get drunk because they will busy themselves in their spare time producing things that delight them and others and represent an economic value for them and the country."[1]

That craft culture can be synthesized with business is shown in the panama hat industry. And yet there are other craft cultures in Ecuador

[1] As given in a most instructive recently published book, *Andean Adventure,* by Lilo Linke.

that cry for development. In many instances all that is needed is styling assistance and technical improvement. Rugs, for example. In Riobamba, under the cold glacier shadow of Chimborazo, there is a colony of rug weavers. Working with sheep and llama wools on primitive looms, their products are striking in their selection of barbaric colors and primitive designs. It is not necessary to change the form. It is only necessary to assist them in obtaining vegetable colors rather than aniline colors, and to suggest rug sizes that fit into the scheme of North American homes; then they, too, could change their environment as the panama-hat weaver has changed his.

Cuenca has indicated the way. No longer can people complain about the Cuencaños, as did Ulloa in the eighteenth century, that they "have a strange aversion to all kinds of work." Cuenca is a thriving active community. And there are still other new things to come.

Expedition in Assam

DURING the past year, F. Kingdon-Ward has been collecting plants on the Burma-India border on an expedition initiated by the New York Botanical Garden. His primary purpose is to obtain plant material, especially ornamental species, that will be suitable for culture in the warmer parts of the United States. Sponsoring the expedition jointly with the New York Botanical Garden are the Huntington Botanical Garden, San Marino, Calif., Edgar B. Stern of New Orleans, and Suydam Cutting of New York, himself a former plant explorer in Asia, and author of "The Fire Ox and Other Years" published in 1940. Mr. Stern is a member of the Corporation of the New York Botanical Garden.

Mr. Kingdon-Ward, who has made fourteen expeditions in search of ornamental plants in Asia, is without doubt the most experienced plant explorer in the world today. The present expedition was originally planned before the last world war, but was not begun until early in 1948.

To date, seeds have been received of 260 species of selected plants, none of which, so far as is known, is yet in cultivation in America. Among the more familiar genera represented are *Viburnum, Callicarpa, Gentiana, Jasminum, Begonia, Ardisia, Albizzia, Ilex, Iris, Lobelia, Corydalis, Buddleia, Vaccinium, Primula, Anemone,* and *Spiraea.* The seeds received have been distributed among the sponsors of the expedition, and additional lots have been presented to other growers in regions where the plants are expected to thrive.

Mr. Kingdon-Ward, who is accompanied on the expedition by his wife, has also collected herbarium specimens of about 1,000 species. The collecting has been done with headquarters in Imphal, the capital of Manipur State, Assam.

Early in the expedition, Mr. Kingdon-Ward wrote from Ukhrul in Manipur, concerning a ten-day visit to Sirhoi, an 8,400-foot peak to the east:

"In the highest (temperate) forest about 7,000 feet, *Michelia* is common, and *Magnolia* not rare. I also found a very fine species of *Sorbus*, probably new, bearing enormous clusters of carmine-scarlet berries; some of these trees were fully a hundred years old. There is a beautiful white rhododendron of the Maddeni series which is common above 7,000 feet; it sometimes has a definite pink blush. The temperate forest consists largely of oak, Magnoliaceae, *Acer* species, birch, and *Rhododendron arboreum;* and I found one specimen of the pure white *R. Lindleyi.*

"On the open hillside, fully exposed to the prevailing westerly winds, *Nomocharis* grows prolifically. It flowers in

the rainy season, but we carefully dug up half a dozen good plants — two of them showing as many as seven flower buds — and brought them back in their own earth to Ukhrul, where we hope to see them flower in our garden in due course. Growing with the *Nomocharis*, and as abundantly, were two species of *Iris;* these also we have transplanted, and hope they will flower during the rains.

"There were several fine species of cherry in flower (the carmine cherry, *Prunus cerasoides,* grows on Sirhoi, but its flowers were almost completely over), and a *Pieris* with beautiful young red foliage was found above 8,000 feet. Many of the temperate forest trees and shrubs have beautiful foliage, for example, *Vaccinium Griffithianum* and certain species of *Ficus.* In fact, the variety of woody plants worth growing for their foliage, fruits or flowers, is surprising. Only one *Primula* was found, and only a dozen plants of that. It is a white-flowered species of the Obconica section, and was growing on a shady bank along a forest path."

Two months after the Sirhoi trip he wrote:

"One of the irises we brought down from Sirhoi in April has flowered in our garden, and this — coupled with the great improvement in the weather, and our wanting to see the nomocharis flowering on the mountain — induced us to try and spend a week on Sirhoi . .

"We reached the beginning of the long ridge by 10 o'clock, and at this height — 7,500 feet — saw a small white anemone on the open grass face, and a lonicera and two viburnums growing at the edge of the forest . At about 8,000 feet the nomocharis and the smaller of the two irises were at their best. Both are very lovely, the nomocharis having pink bell-shaped flowers with a purplish satiny sheen, and the iris small blue flowers with a yellow crest. The larger iris . . . barely in flower . is a bearded species with slate-blue flowers. In the last 200 feet before the top we found a beautiful pale mauve primula just coming into flower, which was not showing at all in mid-April."

Expectations are that a large number of the plants being collected on this expedition by Kingdon-Ward will take their place in American horticulture, as the plants that he has previously collected for the Royal Horticultural Society and other institutions abroad have played a prominent part in horticulture, particularly in the British Isles, in recent years.

Notes, News, and Comment

Board of Managers. Sidney Lanier was elected to the Board of Managers of the New York Botanical Garden in the class of 1950 at a board meeting Jan. 28. Mr. Lanier is a member of the firm of J. P. Morgan & Co.

Rutherford Platt is the new representative of the Torrey Botanical Club on the Board of Managers, succeeding Dr. F. J. Seaver, who is now retired and living in Florida. Mr. Platt, who is a plant photographer of note, also vice-president of Platt-Forbes advertising agency, is author of "This Green World" and "Our Flowering World." An article on his 1947 Greenland expedition with Donald MacMillan appeared in the Garden's Journal for April 1948. He has lectured several times at the Garden, and has been a member of the Corporation since 1940.

Advisory Council. New members of the Advisory Council, elected by the Garden's Board of Managers Jan. 28, are Mrs. John D. Beals, Mrs. George Doubleday, Mrs. Percy L. Douglas, Mrs. Ethelbert Ide Low, Mrs. Harold R. Mixsell, and Mrs. Herman G. Place, all of New York City. The resignation of Mrs. William F. Hencken, who has been a member of the Advisory Council for 14 years, was accepted Jan. 20.

Lectures. Dr. B. O. Dodge addressed the Torrey Botanical Club Feb. 1 at Columbia University on "Taxonomic and Genetic Features Bearing on the Origin of *Neurospora tetrasperma.*"

Dr. W. H. Camp spoke on "The Genetic Structure of Infraspecific Populations" at the Academy of Natural Sciences in Philadelphia Jan. 22. He gave a second lecture in Philadelphia Feb. 15 when he addressed the weekly Botany Seminar of the University of Pennsylvania on "The Telome Theory and its Relation to Phyletic Interpretations in Vascular Plants."

Members of the Industrial Research Institute, Inc., founded under the auspices of the National Research Council, heard Dr. Camp speak Feb. 3 at their three-day winter meeting at Rye, N. Y., on "The Modern Economic Plant — A Product of Biological Engineering."

Dr. William J. Robbins spoke on "The Importance of Plants" at the Pittsburgh Garden Center Jan. 13. With Mr. Everett, he addressed the Botanical Garden's Advisory Council Jan. 20, at the home of Mrs. Thomas D. Thacher.

Garden Club Affiliates who have heard staff members speak during recent weeks include the Green Fingers Garden Club of Greenwich, Dr. H. W. Rickett on "Families of Garden Plants" Jan. 11; Watnong Garden Club, Morristown, N. J., E. J. Alexander on "Plant Collecting in Mexico" Jan. 10; Essex Fells Garden Club, E. J. Alexander on "Wild Flowers for Our Gardens" Jan. 15; Douglaston Garden Club, Dr. H. W. Rickett on "Gardens of Cloister and Castle" Jan. 18; Bedford Garden Club, T. H. Everett on "House Plants" Feb. 16; Little Garden Club of Rye Feb. 16 and Mt. Vernon Garden Club Feb. 21, Dr. P. P. Pirone on "Maintenance of Shade and Ornamental Trees."

Among other lectures recently given by staff members are "Forest Types of North America" by Dr. W. H. Camp before the Hortulus Club of Greenwich Jan. 18; and "Plant Collecting in Mexico" by E. J. Alexander before the Hippocrates Society at the annual meeting in New York Feb. 21.

Staff Conference. The personnel of the physiological laboratories was presented to the balance of the staff by Dr. William J. Robbins at the conference of Jan. 25. Those introduced were:

Dr. Igor N. Asheshov, Bacteriologist, in charge of research on anti-bacteriophage substances, with two research assistants, Frieda Strelitz and Elizabeth A. Hall and technical assistants David Woodall Smith, Jean Muncell, Mrs. Ethel Bachmann, Mrs. Nancy O'Connor, and Mrs. Frances S. Moore.

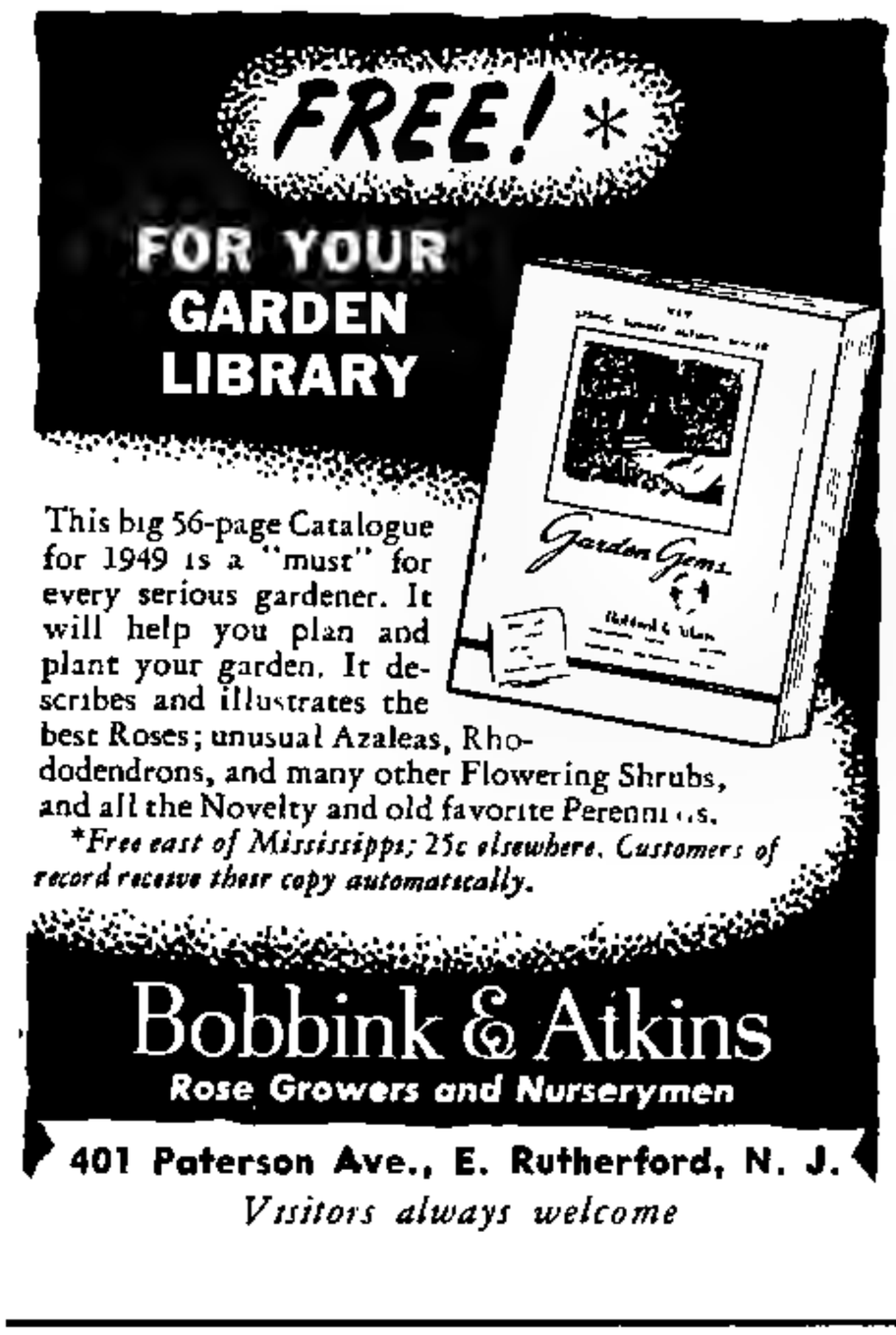
Dr. Robert S. de Ropp, Assistant Curator, in charge of investigations in plant tumors, with technical assistant Edith Robbins.

Dr. Marjorie Anchel, Research Associate, working on chemical analyses of antibiotic substances, with technical assistant Elayne Shapiro.

Dr. Annette Hervey, Research Associate, working on Basidiomycetes as possible sources of antibiotics, with technical assistant Corinne Massoth.

Mary Stebbins and Mrs. Anita Rolnick, investigating mutations among the fungi; Jerome Polatnick, technical assistant, and Dr. Frederick Kavanagh, Associate Curator of Laboratories.

Visitors. Dr. Gabrielle Goidanich, plant pathologist of the Stazione di Patologia Vegetale in Rome, visited Dr. P. P. Pirone at the Garden Jan. 25. Among recent visitors in the physiological laboratories have been Geoffrey W. Rake of Squibb Institute for Medical Research; W. C. Price of the Virus Laboratory, University of Pittsburgh, with Dr. Sam F. Trelease of Columbia; S. H. Hutner of Haskins Laboratories; B. Tabenkin of Hoffmann-LaRoche, Inc.; Ehrenfried E. Pfeiffer, Spring Valley, N. Y.; T. H. Jukes and E. L. R. Stoddard of Lederle Laboratories, and B. M. Gupta from India, a student at the Plant Virus Laboratory in Pittsburgh.



Lyman B. Smith of the Smithsonian Institution in Washington investigated herbarium material at the Garden Jan. 14, and Ralph W. Chaney of the University of California at Berkeley spent the day Feb. 4 studying some of the Garden's fossil collections.

Other visitors have included J. G. Saha, Calcutta, India; A. Gilles, University of Louvain, Belgium; Aase Reinhard, Copenhagen, Denmark; H. G. Mirchandani, Sakrand, Sind, Pakistan; Valerie Finnis, Waterperry Horticultural School, Wheatley, Oxford, England; Ruth Ehrlich, University of Vermont; Caroline K. Allen, Pawling, N. Y., Esther Ann Huebner, The Cloisters, New York City; Marcella Carter, California Institute of Technology; Harry E. Ahles, University of Illinois; G. G. Nearing, Demarest, N. J.; M. A. Chrysler, Chaplin, Conn.; Arthur Harmount Graves, Wallingford, Conn.; William H. Clark, Editor of *Horticulture*; G. H. H. Tate, American Museum of Natural History; Walter N. Ezekiel, plant pathologist, Bureau of Ordnance, Navy Department, Washington, and Mr. & Mrs. Armando T. Hunziker of the Botany Department, University of Córdoba, Argentina.

Seeds for Abroad. Seven different packets of vegetable seeds suitable for European culture may be included through March in food packages being sent overseas through the American Women's Voluntary Services, 99 Park Ave., New York 17, N. Y. CARE packages also may be sent with seeds included, or a selection of vegetable seeds may be sent separately. Special selections are made for northern and southern countries.

Maui Collections. During a collecting trip of two weeks on the Hawaiian island of Maui at the end of December, Otto Degener discovered a number of plants that were new to the "Valley Isle," according to a news dispatch from Wailuku, Maui. Accompanying him on the expedition were Louis Brand, exchange professor from the University of Cincinnati, and two students from the University of Hawaii.

Systematics. Dr. H. N. Moldenke has been added to the staff of Hunter College in New York, to teach an evening course in systematic botany. He is giving the course for the second time this year during a term of 30 sessions which began Feb. 15.

NOTICES AND REVIEWS OF RECENT BOOKS

Beautiful Begonias

TUBEROUS BEGONIAS. Worth Brown. 128 pages, 67 drawings, list of sources, bibliography, index. M. Barrows & Co., New York, 1948. $2.75.

The Latin expression, *multum in parvo,* may well be applied to this book, for it contains much information in the small compass between its covers.

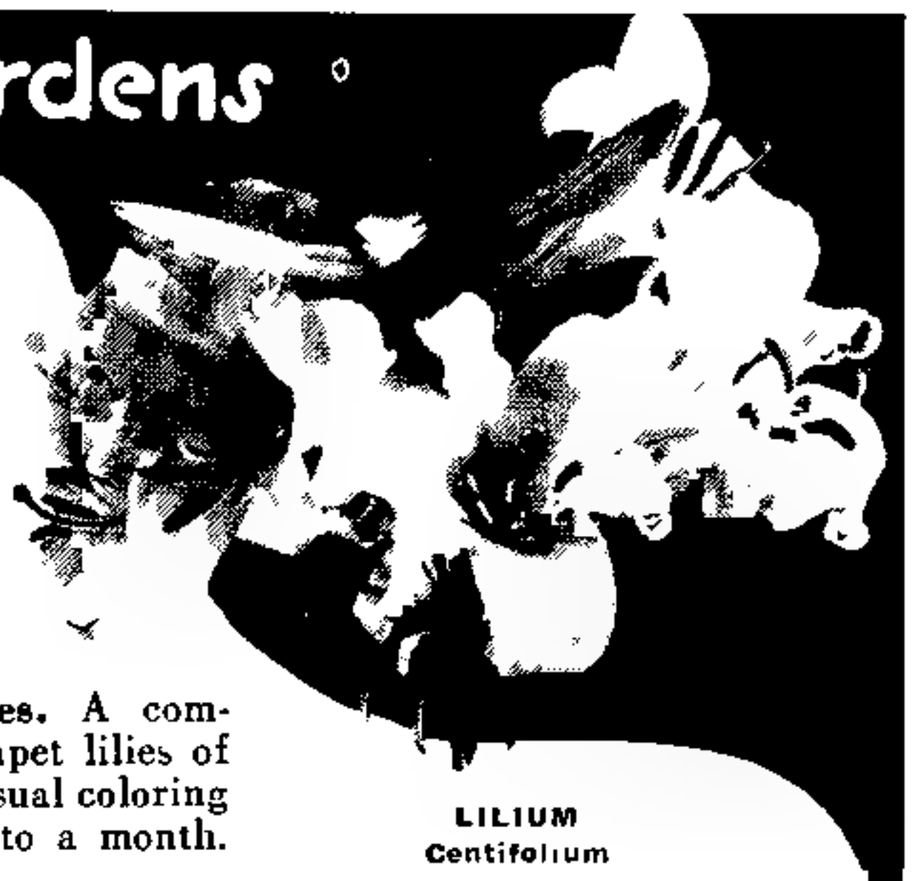
Lest the following comments be misunderstood, let their writer confess that he is in no sense a begonia expert. He has merely grown a few tuberous begonias with moderately satisfactory results, and is therefore looking at the book as an ordinary backyard gardener.

The type and illustrations are good; both are easily read, except that in a few places the illustration shows through the paper and slightly blurs the printing.

Chapters I and II relate the history and describe the species and varieties of the tuberous begonia. Both are interesting reading. Six of the subsequent chapters describe in clear detail the propagation of this plant from seeds and cuttings, the method of growing it from tubers, its pot culture, care of dormant tubers, prevention of disease, and the control of pests. Chapter VII is devoted to culture in lath houses for which few amateurs would have space, while Chapter X deals with the use of the blooms for cut flowers. Chapter XI might have been headed "Lest We Forget." It is an excellent month-by-month summary of the culture of the tuberous begonia.

The author speaks of begonia cul-

Wayside Gardens



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Giant Gaillardia "*Gen. George Patton*". Enormous 4" flowers—dark red petals tipped with gold. 3½ ft. plants produce 60 or more flowers, blooms all summer.

Two New Border Pinks. *Dianthus Evangeline* (soft persian rose) and *Dinah* (deep persian rose—maroon center) flower profusely spring and fall. 8 to 10" tall. Spicy fragrant.

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Forty-Niner (*AARS1949). Brilliant bi-color with outside of petals a rich, chrome-yellow and the inside the vivid orient-red of Chinese lacquer. Vigorous grower.

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*All America Rose Selection for 1949.

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ture in California, the Middle West and even Westchester County, New York. He is to be complimented on the clarity of his descriptions of the how-to-do. One suspects that he has in him the makings of an excellent teacher. While this reviewer is not familiar with the literature of the tuberous begonia, he nevertheless believes that Mr. Worth's book is a welcome addition to garden lore.

JOHN H. MYERS.

For the Youngest Readers

SPRING IS HERE, SUMMER IS HERE, FALL IS HERE, WINTER IS HERE (four books). Bertha Morris Parker. 36 pages, each illustrated in full color. Row, Peterson & Co., Evanston, Ill., 1948. 48¢ each.

The littlest readers can become aware of the changes in the sky by day and night, in trees, flowers, weather, animals, and birds from season to season, by making acquaintance of these four delightful books. Each one is illustrated in full color, with only a few simple lines for easy reading on each page.

JOHNNY MAPLE-LEAF. Alvin Tresselt. 28 pages, illustrations by Roger Duvoisin. Lothrop, Lee & Shepard Co Inc., New York, 1948. $2.

Another seasonal book is "Johnny Maple-Leaf", which is more of a story, with a full-page picture in color by Roger Duvoisin opposite every page of large-lettered text.

Out of the 17th Century

THE COUNTRIE HOUSEWIFE'S GARDEN. William Lawson. 53 pages. Trovillion Private Press, Herrin, Ill. 1948. $5.

This, the first garden book written expressly for women, deals mostly with herbs grown in Elizabethan gardens.

Out of print since 1683 — with the exception of one very small edition long since exhausted — we are grateful to the Trovillion Press for bringing back this book in such a beautiful format. We feel this is an ageless book, and the information written by an experienced old Yorkshire gardener, seems as appreciable today as when it was printed 300 years ago.

The final chapter of his later book, published in 1618, "A New Orchard and Garden" has been reproduced at the end of the book by the publishers to show "Its enthusiastic and joyous praise of gardening, and because of the elegant Elizabethan style of writing" This is definitely a collector's item.

NOREEN SHERIDAN CAPEN,
President, Herb Society of America.

Misleading Guides

LET'S LEARN THE FLOWERS. Marshall McClintock. 28 pages, illustrated in color. The Chanticleer Press, New York, 1948. $1.

A rather impractical way for American children to "learn the flowers" is by looking at pictures of flowers seldom seen except in England. The book opens with a daisy—looking like almost any daisy, it is true, but actually a greatly enlarged color photograph of *Bellis perennis,* which is so common in English lawns. Gorse from Great Britain is included, likewise the English cowslip, with a text which mentions also the marsh-marigold, the shooting star, and the "Virginia cowslip, often known as the Bluebell."

The violet, which is not an American species, but *Viola odorata,* is made to look larger than a pansy; the evening primrose bigger than a poppy; the calendula is tomato-red instead of orange or yellow; the "mock orange" shown on page 20 is plainly one of the pome fruits in flower, and the plant labeled "Orobus vernus," which is a legume, is a species of jasmine.

LEAF, FRUIT AND FLOWER. Marshall McClintock. 28 pages, illustrated in color. The Chanticleer Press, New York, 1948. $1.

The text for this book is more satisfactory than the preceding one. It is still unfortunate, however, that certain pictures were included simply because they were available. As one example, for the maple, with the title "Sugar is Sweet," the English sycamore maple, *Acer pseudoplatanus* is shown—a tree far different in every detail from the American sugar maple.

CAROL H. WOODWARD.

New Material for Students

AN INTRODUCTION TO PLANT ANATOMY. Arthur J. Eames & Laurence H. MacDaniels. 427 pages, illustrated, indexed. Second edition, 1948. McGraw-Hill, New York. $4.50.

During the past two decades anatomical researches in the vascular plants, especially in the Angiosperms, have introduced many new facts, new terminology,

and strange-sounding theories which are not easily available to the beginning student. The second edition of this well known textbook by Eames & MacDaniels brings plant anatomy up to date and embodies a more comprehensive treatment of its fundamentals. The authors have incorporated new facts in the chapters on cell wall origin, meristems, phloem, leaf development, abscission, flower and fruit structure. Also certain changes have been made in terminology to keep pace with increasing knowledge and to conform with recent researches. References at the close of every chapter have been selected with great care and are sufficient in number to have value as research references for advanced students. A few new photographs and diagrams have been added.

E. E. NAYLOR

Trade Booklets

LET'S PRACTICE SOIL CONSERVATION FOR A PERMANENT AGRICULTURE. 24 pages, illustrated. International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill. Free.

The need for erosion control on crop and grazing lands in different parts of the country is explained, and, through photographs and diagrams, methods and effects of proper care of the land are shown.

THE MAHOGANY BOOK. George N. Lamb. 71 pages, illustrated. Mahogany Association, 75 East Wacker Drive, Chicago 1, Ill. Sixth and seventh editions, 1948. Free.

History of mahogany use, styles of mahogany furniture, notes on famous cabinetmakers, present-day uses of mahogany, and characteristics of different types of mahogany wood are included. Covers and inset pages represent in color 32 types of mahogany grain and finish.

The seventh edition has a number of chapters added on mahogany names, mahogany substitutes, and rules for the designation of furniture woods according to the regulations established by the Federal Trade Commission.

Saintpaulias

A HANDBOOK FOR AFRICAN VIOLET GROWERS. Mary Margaret Odom. 60 pages, illustrated, published by the author at DeWitt, Iowa, 1948. $1.50.

This small paper-covered volume contains, in addition to general directions for the culture and propagation of African violets, suggestions for African violet clubs (including programs, poems, games and songs), outline drawings of a score of varieties, further illustrations and descriptions of numerous others, and a reproduction of the official color chart of the New England Gladiolus Society, with reference to the recorded colors of about fifty *Saintpaulia* varieties.

Awe-Inspiring Trees

THE REDWOODS OF COAST AND SIERRA. James Clifford Shirley. 84 pages, illustrated. University of California Press, 1947. $2.

All of the questions that one might ask about the awe-inspiring redwood trees of California seem to be answered in this small but comprehensive book, whose concluding plea is, "Save the Redwoods!" It would be easier to handle and read were it not issued in a stiff, crackly, paper binding and printed throughout on a high-gloss coated stock (like this or better), which gives fine reproductions but also throws out troublesome highlights from each page of text.

CAROL H. WOODWARD.

Azalea Schlippenbachii in a New Jersey Garden

THE eight- to ten-foot plants of *Azalea Schlippenbachii* which are illustrated here were started from seed 20 years previously. Since about their fifth year, they have never failed to open their large, fragile-looking, but strong blossoms of delicate pink around the first of May. Even the difficult season of early 1948, with its heavy snows and exceptional cold, did not damage the "Schlipps" in any way.

Edward O. Birch of Short Hills, N. J., who obtained the seed from

Korea, gave detailed directions for raising these plants successfully in the Journal for April 1944. So heavy has been the demand for this Journal that there are no copies left. To meet further requests of gardeners interested in this decorative plant, which has always been thought difficult to raise, the New York Botanical Garden has had Mr. Birch's directions mimeographed. Copies will be mailed to anyone upon request at five cents each.

CHOICE AZALEAS FROM SEED

These specimens of *Azalea Schlippenbachii* were started from seed twenty years ago. They have been grown by Edward O. Birch, a member of the New York Botanical Garden, at Short Hills, N. J. A close-up of the delicate-appearing pink flowers is shown in the lower photograph. Primulas border the azalea bed.

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

THE CORPORATION OF THE NEW YORK BOTANICAL GARDEN

The New York Botanical Garden was incorporated by a special act of the Legislature of the State of New York in 1891. The Act of Incorporation provides, among other things, for a self-perpetuating body of incorporators, who meet annually to elect members of the Board of Managers. They also elect new members of their own body, the present roster of which is given below.

The Advisory Council consists of 12 or more women who are elected by the Board. By custom, they are also elected to the Corporation. Officers are: Mrs. Thomas D. Thacher, Chairman; Mrs. Guthrie Shaw, First Vice-Chairman; Mrs. Charles Burlingham, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Philip B. Weld, Corresponding Secretary; and Mrs. Junius A. Richards, Treasurer.

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JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

APRIL

1949

IN THIS ISSUE:

GARDENING WITH POTTED PLANTS

LICHENS

CULTURED MILK

TRACTOR TRAIN

NOTES AND NEWS ABOUT THE GARDEN

BOOK REVIEWS

PAGES 73—96

VOL. 50 NO. 592

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ON STEPS OF
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The Members' Day program for May will take place May 26, which will also be Board of Managers' Day at the New York Botanical Garden, with the annual meeting and the dedication of the new Montgomery Conifer Collection.

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The Easter display in the Conservatory will begin on April 16 and continue for two weeks or more. Permanent displays are on view the year around, the Conservatory remaining open until 4:30 p.m. daily throughout the spring and summer.

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The Thompson Memorial Rock Garden will be open for the season by Easter Sunday. Until the end of May there will be an ever-changing carpet of colorful bloom from the thousand or more different kinds of flowering plants being grown and displayed here. Flowers will continue all summer, but the rock garden is at its best in April and May. This season also brings daffodils, magnolias, flowering cherries, azaleas and dogwood blossoms to the grounds of the New York Botanical Garden.

Museum Exhibits

Dishes designed from flower prints obtained in the New York Botanical Garden's library, placed on sale March 1 by R. H. Macy & Co., will be on display on the main floor of the Museum from April 15 through May 31.

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JOURNAL

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THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

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Gardening With Pots Out-of-Doors

By Helen M. Fox

THE gardens of Spain, Italy and China have always been primarily pot gardens. With few exceptions they were small so it was easy to furnish them with enough potted plants to be effective in the patios and courtyards, on stairways and terraces or standing on wide balconies where they formed attractive pictures and provided color and interest.

Along the Mediterranean and in other lands where summers are hot and dry, the ground parches and sometimes bakes. Gardeners in these countries, down through the ages, have found that it requires far less water to keep the soil moist in a few pots than in a sizeable garden of ornamentals. Pot gardening is such an established usage that in the botanical gardens at Madrid all mature plants, as also seedlings and cuttings and even cabbages and lettuces, were and perhaps still are raised in pots which are placed in the shade of a wide tree-lined walk until ready to be moved into the border.

There are many situations in our own land either without soil or with very poor soil where pot gardening would be a highly satisfactory way of growing plants — as, for example, in city squares, roof gardens, public parks, around bandstands or fountains, along the sides of steps, or bordering an entrance walk and in city back yards. Moreover, these places have space for only a few plants and to get the best effect from them they ought to be blooming all season. Such uninterrupted bloom is much easier to provide with pot plants than when plants are rooted in the ground.

An essential adjunct for growing plants in pots is a place such as a cool cellar, greenhouse, or sun-heated pit in which to winter the half-hardy specimens — the jasmines, oleanders, and lemon verbenas. Also there has to be either a garden room or greenhouse in which to root cuttings in order to keep up the supply of geraniums, fuchsias, begonias, and other reliable treasures.

In selecting pots it is most satisfactory to keep all the containers in harmonious shapes and colors and not put the pot containing Uncle John's Christmas cyclamen in with others of entirely different design and hue. Pots come from many lands. The handsomest to my taste are the Chinese. They are frequently shaped like low bowls; sometimes they are high and wide with vertical sides, and they always have huge holes in their bottoms. They are either in the solid colors made famous in Chinese pottery — jade green, eggplant, eggshell, or the blues called china or porcelain blue, or they are embellished with carvings of birds and flowers or with sayings from the Chinese poets. Next in beauty are Sicilian pots made by modern descendants of Greek potters who still adhere to the old models. These pots are sometimes high and round with flaring lips, sometimes clay imitations of low wicker baskets which are fine for weeping plants, or again in other shapes. Mostly they are of a natural roseate tan clay and without any glaze. In old French and Italian gardens, owners looked for original antique Greek or Roman pots and, failing to find them, would employ famous sculptors to design pots for them. Copies of the antique and Renaissance pots can be secured today, and these make exquisite accents for prominent places. Other copies of simple Roman and Spanish pots can be bought in the United States and sometimes there are shipments of originals.

Before putting the soil in a pot it is important to place a few pieces of broken clay over the hole in the bottom in order to keep the drainage from being too swift. The soil varies somewhat, containing more or less sand, humus or rotted manure in its make-up, according to the requirements of the plants. On the average, the soil mixture consists of one-third rotted cow manure, one-third rotted compost or thoroughly rotted leafmold, and one-third sandy loam, with several handfuls of sand added to each pailful of the mixture. Fuchsias have done very well for me in a composition of half rotted leaves and half rotted manure with no soil or sand. There must be other special mixtures for special plants. Some gardeners put bonemeal in their mixture but where the plant is at home in acid soil, it might be better to use one of the general fertilizers such as 5-10-5* I do not fertilize with chemicals until the plant has become established in the pot. I then give only small quantities once a week, provided the aim is to keep the plants in the pot garden flowering and lush-looking without forcing them to a larger size — for that is a different story. Another necessary practice is to prune the plants to keep them bushy and prevent them from being leggy.

Potted plants should be placed far enough away from a wall to cast a shadow on the terrace or the ground, and far enough from each other to allow plenty of space for branching out and also for air currents to

* 5% nitrogen, 10% phosphorous pentoxide, 5% potash. The figures, in this order, should be found on the label of any packaged commercial fertilizer.

Potted plants, with contrasts in foliage form and flower coloring, make an effective border to a terrace adjoining a house. Photograph made at "Foxden," the author's home at Peekskill, N. Y., by Gottscho-Schleisner.

pass freely around them and discourage mold or bugs from settling on the foliage. When the groups consist of a few plants only, three, five or seven are easier to arrange than even numbers of pots. Also, the heights of the plants should vary, with tall plants in the background. A few plants with glossy foliage such as laurel or sweet olive or even a camellia or gardenia form a pleasant contrast to plants with dull-surfaced leaves such as rosemaries or geraniums. The effect of solid leaves, too, is softened by interspacing a few feather-leaved geraniums or cut-leaved lavenders. The colors in the flowers depend on the gardener's taste and there is no limit to the many possibilities.

A great many annuals, perennials and shrubs can be grown successfully in pots. Shrubs, it is true, have to be kept small enough to thrive in the pot by pruning the roots before repotting in spring and by careful pruning of branches soon after the bloom is over.

To look well in pots, in my opinion, plants must have a shape that is suitable to be lifted high off the ground and the adaptability to grow well in a confined place. They should be rambly or misty, but should be compact and preferably leafy, with either conspicuous flowers or unusual foliage.

Anyone can have a pot garden composed of annuals and half-hardy plants. Certain combinations have become almost hackneyed, they have been used so frequently, but are charming nevertheless. Such combinations are white marguerites and red geraniums; pale gold and orange calendulas with purple petunias and blue ageratums; begonias with heliotrope; forget-me-nots and pansies. Carnations do well in pots and so do sweet williams, which can be planted with violets. Other plants which thrive in pots are chrysanthemums, cinerarias, and some of the tall tuberous-rooted plants such as *Agapanthus* and such fleshy-rooted subjects as atamasco lilies (*Zephyranthes*) and varieties of *Zygadenus*. Less well known for pots but highly satisfactory are polyantha roses. For background plants there are oleanders with white, pink, red and even

Chinese pots and pedestals set off the plants which are used at the approach to a grassy terrace on the author's property at Peekskill. Photograph by Walter Beebe Wilder.

salmon-colored flowers. Orange or lemon trees or bushes of gardenias add to the picture, and so does a *Tibouchina* with its stunning purple blooms.

Each gardener selects the plants he prefers and those which do best in his situation. I have gone in principally for fragrant plants, beginning with those which are not hardy out-of-doors in winter. As a side issue there are fuchsias, oleanders and begonias, which last are the best of all house plants for me. Fuchsias I cannot list for I pick them up whenever I see one that is attractive, in every possible place, from nurseries to wayside stands and county fairs. Begonias are represented by many specimens and have been exchanged with friends as also obtained through catalogs. The geraniums — or rather pelargoniums — constitute the mainstay of the pot population. Some of these are plants with large and beautifully colored flowers, others are varieties with highly colored foliage such as ***Bronze Beauty*** and ***Mrs. Burdett Coutts.*** There are a few varieties of the weeping forms — some of which, oddly enough, seem to disappear — and also plants of the ***Lady Washington*** strain. The bulk of the collection consists of plants with leaves having special fragrances, such as those smelling of mint and shaped like ivy, foliage fragrant of lemon with tiny crumpled leaves, another form with slightly larger leaves, others smelling of apple, nutmeg, orange and balm.

The principal herbs that I grow are lemon verbena, rosemary, and sweet bay, as well as two lavenders, *Lavandula dentata,* which makes a handsome shrubby plant, and *L. abrotanoides,* not as easy to keep and somewhat sprawly. There are several superb salvias among my pot plants, such as *Salvia Greggii,* with exquisitely shaped crimson blooms; *S. microphylla,* with blossoms of true scarlet; *S. Clevelandii,* marvellously fragrant, and the strongly scented pineapple sage. Then too there are bushes of jasmine which with pots of tuberoses furnish delicious fragrance for late summer and on into Thanksgiving.

The flowering plants are removed from the terrace when their bloom is over, unless their foliage is decorative, and they are then replaced with others. In winter the half-hardy population gives way to evergreens in wooden tubs, since pots of clay or concrete crack.

Thus, not only all through the growing season, but from fall to spring, there is interest and variety among the potted plants outdoors.

On the Cover

Steps between terrace and lawn are edged with geraniums of many varieties, some in Sicilian clay pots made in imitation of wicker baskets. Photograph by Gottscho-Schleisner.

Lichens . . .

Their Structure, Habits, and Uses Described

By John W. Thomson, Jr.
University of Wisconsin

UNIQUE in form, varied in appearance, and adaptable in habitat (being dispersed from arctic and antarctic regions to the equator), those enigmatic little plants called lichens have always been a puzzling division of the plant kingdom. It was not until long after the development of the microscope that their nature became understood. They still test the ingenuity of the botanist quite as much as they challenge the layman who tries to comprehend them.

These are not simple plants like the vegetables of our gardens or the trees of our forests. To understand why, take a *Parmelia,* one of those pale, leaf-like, greenish-gray scales from a tree trunk, and cut thin slices across it. Through the microscope a slice of this lichen will show that it has layers like a sandwich. The upper layer is of clear cells; beneath it is a layer of green cells, then a lower layer which again is clear but much more spongy than the upper layer; finally there is a lowermost protective layer.

It was in 1867 that the real identity of these layers in the plant was established by S. Schwendener, who startled lichenologists of his day when he revealed his discovery of the dual nature of a lichen plant. Up until then, it had been recognized that the green cells bore a remarkable similarity to algae, and the colorless threads a striking resemblance to fungi. With Schwendener's announcement that a lichen is actually a composite of plants, the existence of this unique partnership was brought to light.

The full function of each of the members of the partnership yet remains to be fully explored, but basically the green plant, or alga, manufactures foods, and perhaps other substances for the partnership, while the fungus aids in absorbing moisture and possibly other substances for this dual organism. The algae that form the partnership are related to those that form the green stains on rocks and tree trunks in moist places, and those that grow on soil and in our lakes. The fungi in most of the lichens are related to the molds and to the cup-fungi, the Ascomycetes, as the botanist calls them.

This partnership of plants is an enormously successful one, making it possible for lichens to occupy many niches in nature that other plants have found uninhabitable. In the bleak south polar regions the only plants are

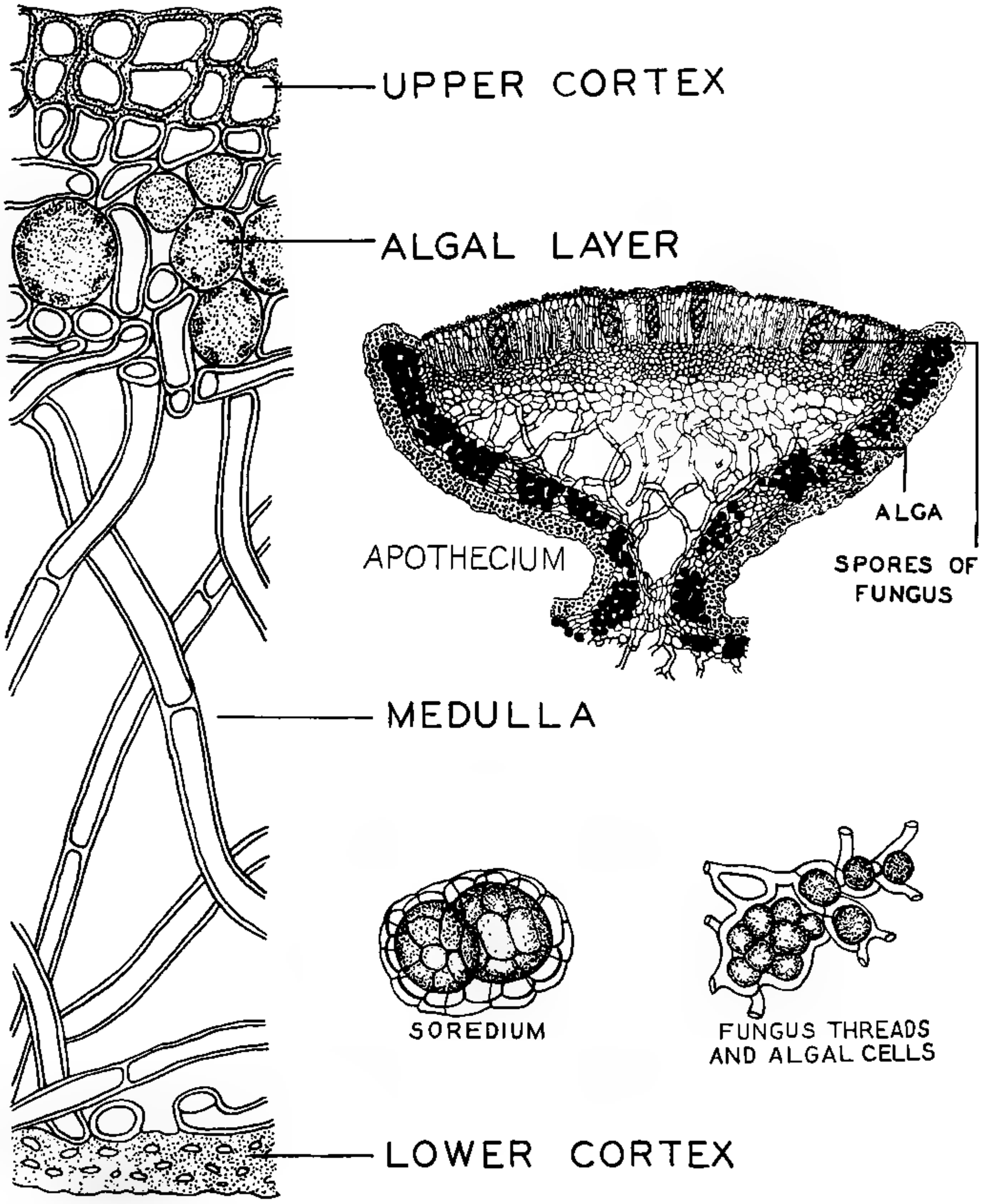
some three hundred species of lichens and five species of mosses! Lichens grow in the Libyan deserts and in our own North American deserts. The mountaineer, climbing high above timberline, sees lichens in abundance around him. Even in temperate regions such unpromising habitats as rock outcrops, tree trunks, and open sandy soil in pine barrens may be productive places in which to find lichens. Some, such as the brownie's buttons, *Biatorella clavus,* may work their way beneath the grains of quartz in hard rocks such as granite. The light reaches the lichen through the transparent grains of quartz, and only when the fungus, fruiting, forms its tiny disks on the surface does the lichen become noticeable. Lichens such as this may be pioneers, followed by mosses and other plants in forming soil from rocks.

Such a partnership as this has its obvious difficulties in reproduction. Probably the most successful method is for a fragment of the plant to break off when it is dry and brittle and blow away to lodge in another place. Many lichens form little granules called SOREDIA. These consist of but a few cells of the algal partner, covered by a webbing of fungus threads. Dust-like, these granules can be borne by the winds for great distances. Another method, probably less frequently successful, is for the fungus member of the partnership to form spores in an enclosed flask-like, disk-shaped, or open cup structure, called an APOTHECIUM. These spores are forced out into the wind, on an errand of propagation, but to continue living they must alight next to an alga of the right kind. If they do, and if conditions are favorable, the spore will send out a slender thread to grow around the alga, and thus start the development of a new lichen plant.

Many shapes and kinds of lichens are to be seen. The same kind of alga can be found in many different lichens, but nearly every lichen has a distinct species of fungus. Both the alga and the fungus can be isolated from a lichen and grown separately, then recombined to synthesize a lichen of the same kind as was used at the start. The algae, indeed, often do grow free in nature, but the fungi of only a few lichens occur in nature without the alga. When the fungi of most lichens are grown in the special culture media necessary for them to survive, they attempt to form a rough approximation of the structure of the lichen thallus. However, it is only when both partners of the lichen are united that a vigorous thallus results.

More than 15,000 species of lichens are known. Of these more than 1,500 have been listed from the United States, and many more will doubtless be found when more of our scientists study them.

Perhaps one of the reasons why there are so few students of lichens in the United States today is the lack of manuals, especially those prepared for the beginner. Only a few books have been written on the lichens of North America. A golden opportunity exists for those who would like to study these interesting forms of life and contribute to the scientific annals. There is so little known about these plants that we are still in the



LICHENS UNDER THE MICROSCOPE

The sandwich-like layers of a lichen thallus are shown at the left, the thin green layer of algal cells and the medulla, consisting of tangled threads of the fungus, coming between the transparent cortex of the upper and under sides. At the right is the fruiting cup, or apothecium, of a species of *Physcia,* in section, with the fungus spores shown embedded in the upper surface of the cup. Below is a small soredium, or vegetative fruiting body, containing two algal cells wrapped around by fungus threads. When this is blown away from the parent lichen, it has the power of developing into a new plant. Beside it is a sketch made through the microscope to show the relation between the fungus threads of a lichen and the green cells of the alga with which they are associated.

primitive days of collecting information on the kinds that occur in North America and their distribution. Except for a few small and widely scattered collections, the vast stretches of Canada remain unknown to the student of lichens.

"Aren't the lichens difficult to study?" so often asks the uninitiated. They are no more difficult than other groups of plants, but, like the algae, fungi, and mosses, the lichens require the use of a microscope for their absolute identification. Many can be recognized, after practice, with the naked eye, but most require the examination of the kind of fruiting body and the type and size of spores to place them with certainty. Yet they are just as easy to study as the *fungi imperfecti,* which are the cause of so many diseases of plants. Perhaps if the lichens were more pestiferous, like the pathogenic fungi, we would have correspondingly large numbers of people studying them, and not finding them particularly difficult.

Most elementary textbooks of botany classify the lichens as crustose, foliose, and fruticose: a classification as primitive as the mediaeval grouping of all plants into herbs, shrubs, and trees. This is not a classification, but a statement of the manner of growth. The crustose growth forms appear as thin crusts on the surface of rocks, the bark of trees, or on the earth. Sometimes the plant body is embedded within the bark or rocks. Foliose plant bodies take on leafy shapes more or less closely applied to the substances on which they are growing. Fruticose shapes of thallus, or plant body, are essentially shrub-like, but they are variously modified from simple club-shaped bodies to the intricately intertangled growths of the reindeer lichens.

Classified on the basis of the structures formed by the fungus member of the partnership, the lichens are identified mainly by the fungus fruiting body. A very few lichens are formed by the Basidiomycetes, fungi which bear their spores on structures called BASIDIA. These lichens are largely tropical in distribution, although a few occur as far north as Florida. Most of the lichen-forming fungi bear their spores in an enclosed sac, the ASCUS, and thus belong to the Ascomycetes.

The North American lichens fall into four large groups or orders. In the Pyrenulales the asci, or spore sacs, are produced in an enclosed, more or less flask-shaped organ buried in the thallus. A minute pore at the tip allows for escape of the spores. The lichens in this group mainly form thin crusts on rocks and trees, sometimes smooth, sometimes chinky or warty. Inconspicuous, they are seldom noticed by the amateur, and they are unsatisfactorily known, even to the botanist. One of the Pyrenulales, *Dermatocarpon aquaticum,* forms green leaf-like plates on the partly submerged rocks in trout streams, and is sometimes noticed by the trout fisherman on his journeys.

A second group, the Caliciales, forms the asci in an open disk like struc-

ture, and then the asci break down to form a mass of spores in the fruiting body. The members of one genus (*Calicium*) in this group look like exceedingly fine, short pins on wood and bark. The tile lichen, *Cyphelium tigillare,* forms a yellow-green crust dotted with little black immersed fruits on old boards, fence posts, and rails through much of the United States.

The third group of lichens, the Graphidiales (also referred to as the Hysteriales), produces rudimentary fruiting bodies which are irregular, narrow and either rounded or long. To this group belong several lichens which have attracted popular attention. The one most often seen on tree barks with its narrow, irregular fruiting bodies somewhat resembling cuneiform writing is the hieroglyphics lichen, *Graphis scripta.* Visitors to Florida and the tropics are often impressed by the brilliant blood-red and pale green *Chiodecton sanguineum.* Also in this group is the genus *Roccella,* members of which are found along the Mediterranean and Lower California coasts, in the Canaries, and off Africa on the seashore rocks. These are the orchil or orseille lichens, the producers of some of the royal blue and purple dyes of the Old Testament and of mediaeval works. From these strap-shaped fruticose lichens, the dye was extracted until the advent of the more brilliant coal tar dyes of the twentieth century.

The majority of lichens belong to the fourth order, the Lecanorales, which are characterized by having a well developed thallus body and fruiting bodies or apothecia which are more or less round or cup-shaped. Some of these are inconspicuous, but others have been noted for centuries and at times have been of considerable economic or other value. The lover of the out-of-doors of America has probably seen many of these on his trips afield. On the tree trunks are splashes of the golden-green or grayish sea-green of the species of *Parmelia,* and the more delicate lobes of *Physcia.* Visitors to the far western states seldom fail to bring home specimens of the yellow tufts of the wolf lichen, *Letharia vulpina,* or the gracefully hanging lace lichen, *Ramalina reticulata.* The latter, sometimes wrongly called Spanish moss, was used during World War II as a substitute for the "oakmoss" of Yugoslavia as a fixative in the making of perfumes. On granitic and sandstone rock outcrops in the northern states there are many species of the rock tripes, *Umbilicaria.* Boy Scouts sometimes experiment with a pudding made by boiling them. These lichens actually have helped some members of ill-fated Arctic expeditions to survive when other foods had gone. But they are far more attractive in the use made of them in the Tyrol Mountains of Austria as a dyestuff.

Some of the lichens are still of great importance today. The reindeer herds of the Laplanders and the Arctic peoples depend upon the forage provided by the reindeer mosses, which are really lichens. In the arctic and subarctic regions these grow in carpet-like masses several inches thick.

(Turn to page 86)

LICHENS AS YOU FIND THEM

1. "Pyxie cups" are one of the commonest and most appealing of the lichens. The distortion of the cups of *Cladonia chlorophaea* at the right shows that the fungus is in fruiting condition. 2. The parmelias form pale splashes of color on dark tree trunks. This one is *Parmelia caperata.* 3. Fruiting bodies of the fungus of *Biatorella clavus* show as "brownie's buttons" on the surface of a granite boulder. The lichen thallus is within the rock. 4. Mosses and lichens (*Cladonia uncialis*) are growing together here along the edge of a rock outcrop. 5. Rock tripes are sometimes used as an emergency food—or boiled and eaten just as an experience. These two are *Umbilicaria dillenii* and *U. muhlenbergii.*

Bright garden flowers adorn a seaside cottage in the Botanical Garden's display.

Seaside Planting Exhibited By Botanical Garden

Gold Medal Won At International Flower Show

A stretch of sandy beach with a realistic cliff in the background and salt waves lapping constantly over the seaweeds at the shoreline formed the setting for the New York Botanical Garden's exhibit at the International Flower Show at Grand Central Palace, New York, the week of March 21. The sparse planting along the beach consisted entirely of subjects that are normally found along the shore of eastern United States, particularly in the New York region. In front of the cottage entrance which occupied the left rear corner of the exhibit were a few flowers nasturtiums, petunias, rock-cress, and alyssum, with a plant of creeping thyme—such as the owner of a small place at the beach might have to enjoy during the few summer weeks he would be there.

The exhibit, which was entitled "Plants Beside the Sea," was awarded a gold medal by the Flower Show committee. Nearly all of the plants on the beach were native species. Conspicuous among them were beach-grass

Native and introduced plants are also shown as they are found along the beach. (*Ammophila breviligulata*), beach-heather (*Hudsonia*), bearberry (*Arctostaphylos uva-ursi*), all known for their sandbinding properties; prickly-pear cactus (*Opuntia*), bayberry (*Myrica caroliniensis*), American holly (*Ilex americana*), swamp rose (*Rosa carolina*), and the highwater shrub (*Iva oraria*), which is common along the coasts from Massachusetts to Florida. A beach plum (*Prunus maritima*) came into flower in time for the show, and there were deep pink blooms on a rugosa rose, one of the few introduced plant species shown. This native of Japan has run wild from gardens along the entire eastern shore of the United States, thriving in the presence of salt spray. Another Japanese species in the display was the black pine (*Pinus Thunbergii*), which is also known for its sturdy resistance to coastal storms.

To those who inquired about suitable plants for their own seashore places, the Garden distributed a leaflet explaining how to cope with the difficult conditions of gardening near the ocean front and giving lists of suitable trees, dependable shrubs, herbaceous perennials, annuals, and sandbinders.

The committee in charge of the exhibit consisted of E. J. Alexander, W. H. Camp, and A. C. Pfander, with T. H. Everett as chairman.

(Continued from page 82)

Iceland moss, another lichen, still is used as food by man in Scandinavia and Iceland. The manna of the children of Israel is supposed to have been one of the lichens, *Lecanora esculenta,* which rolls along before the desert winds and sometimes piles up in masses. Many lichens are still popular in Europe as a source of vegetable dyes. Besides the orchil lichens (*Roccella*) there are *Lecanora tartarea* and several of lesser importance.* Some of these give browns, others beautiful reddish and purple hues. The color of Harris tweeds has been largely obtained from lichen dyes, called "crottles" in Scotland and the Hebrides.

Several species of lichen are very important to the perfumer in their fixative properties which stabilize the odors of the floral ingredients.

The most curious pages of the books on lichens deal with their former medicinal uses. In the Middle Ages, there existed a widely accepted belief called the Doctrine of Signatures. According to this theory, Divine Providence had placed upon every plant some sign or "signature" which resembled the part of the body or the disease for which it was of value in medicinal treatment. Thus, the cure for jaundice should employ a yellow lichen, *Cetraria pinastri*; the cure for baldness or for the slow growth of beard on an adolescent required the long threads of *Usnea* or *Alectoria.* The lungwort, *Lobaria pulmonaria,* having a surface which somewhat resembles a lung, was prescribed for colds and pulmonary complications. One of the strangest records is the use of the dog lichen, *Peltigera canina,* as a hoped-for cure of hydrophobia, merely because its fruiting lobes vaguely resemble the teeth of a dog. Equally absurd is the value once set upon lichens found growing on human skulls as a cure for epilepsy. These would fetch their weight in gold among believers.

Except for the iceland moss, all lichens have now been replaced by more effective drugs in the pharmacopoeias. Some recent experiments have shown, however, that they may be a source of antibiotics.

The lichens need and deserve to be more thoroughly investigated, especially in this country. Their distinctive dual type of life and their beauty and diversity invite and reward any student's inquisitiveness.

* * * * *

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*A forthcoming number of the Journal will contain a comprehensive article on "Lichens as Dye Plants" by William F. Leggett, author of numerous articles and books on vegetable dyes and textiles.

Tractor Train for Garden

OPERATION of a three-car tractor train around the grounds of the New York Botanical Garden is scheduled to begin in May, provided the roadway now nearing completion over the new bridge across the Bronx River is ready for use by that time. The train, which is similar to those borrowed from the Zoo for tours of the grounds during Garden Week in May 1945, is the gift of Mrs. Harold Irving Pratt, who played a prominent part in the plans for the Botanical Garden's 50th Anniversary celebration at that time. It is to be named the *Floral Flyer*.

Each of the three cars will hold 16 passengers. While the train's schedule and route have not yet been determined, it is expected that it will go to the Conservatory, along the road through the woods to the new bridge in the vicinity of the Rose Garden, north from the Rose Garden along the gorge of the Bronx River, skirting the Hemlock Forest, the collections of deciduous trees, and the magnolias, then turning westward over the boulder bridge and south to the Museum building. A nominal fare will be charged for the ride.

Cultured Buttermilk

How Its Flavor Is Produced By Microorganisms

By Hasan M. Yusef

UNDER the influence of certain groups of microorganisms (either bacteria alone or bacteria associated with some specialized yeasts) the normal condition of milk undergoes an alteration which gives it a flavor that is highly relished by many people.

Many different names are given to fermented milks. Best known to Americans is buttermilk, but there is also ACIDOPHILUS milk, YOGURT (a Bulgarian product), MATZOON (an Armenian drink), LABAN RAYEB (used in Egypt, Syria and Algeria), and KOUMISS (made in Russia from mare's milk). All these different kinds of fermented milk are brought about by the action of one or more microorganisms. The fact that they appear under different names does not necessarily mean that each product is fermented with a different organism.

Milk contains a small amount of sugar called milk sugar, or lactose, which is similar in some respects to the familiar cane-sugar. Certain groups of bacteria attack the milk sugar and change part of it into lactic acid, which gives a sour taste to any kind of milk. If yeast is present, part of the milk sugar is transformed into alcohol and a gas

(carbon dioxide). Milk that has its sugar partly transformed into lactic acid or into lactic acid and alcohol is called fermented milk.

This article is to deal mainly with buttermilk, of which there are, generally speaking, two kinds, churned and cultured. Churned buttermilk comes from the churning of sour milk or cream for the purpose of making butter. The liquid residue is buttermilk. Cultured buttermilk is produced by growing certain species of bacteria under controlled conditions in pasteurized whole or skimmed milk. It frequently is churned before bottling to make the product resemble regular churned buttermilk.

Cultured buttermilk generally has the following composition:

Water	90.5%	
Protein	3.5%	
Fat	0.2%	unless cream is added after preparation to restore the percentage to about 2%
Ash	0.8%	
Sugar and products of fermentation	5.0%	

Preparation of Cultured Buttermilk

In brief, cultured buttermilk is prepared by adding a culture of desirable bacteria to pasteurized skim milk, then incubating it at a temperature suitable for the growth of the bacteria with the production of lactic acid and the desired flavoring compounds. The process of manufacture can be summarized in the following steps:

(1) Fresh high quality (low bacterial content) skim milk is pasteurized by heating to 190° F. for at least 30 minutes. It is then cooled quickly to the incubation temperature (70°-72° F.)

(2) The pasteurized milk is inoculated with a starter culture that contains *Streptococcus lactis* and either *S. citrovorous* or *S. paracitrovorous*, or both. In this mixed fermentation one organism ferments the by-products of the others with the result that a high flavor and aroma are produced. The incubation should be so timed and the amount of inoculum so chosen that the milk will coagulate and attain an acidity of 0.70%—0.80%.

(3) The cultured milk is then cooled to 50° F. and thoroughly stirred until it has a smooth consistency. Care must be taken not to let excessive air into the product. The buttermilk may then be diluted with cream and whole milk to give to it a moderately heavy consistency. After stirring thoroughly, it should be allowed to stand at a low temperature before being bottled to give time for foams to disappear. The bottled buttermilk is stored at 30-40° F.*

Home-Made Cultured Milk

In some types of fermented milk, bacteria and yeast may be associated into small, whitish, cauliflower-like masses called KEFIR GRAINS. Because

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* For more details the reader can refer to the following: E. L. Fouts and L. E. Mull: Manufacture of cultured buttermilk and cottage cheese. Florida Agr. Expt. Station. Bulletin 382, 1943. C. Leasherman and G. H. Wilster: Cultured buttermilk and acidophilus milk. Oregon Agr. Expt. Station. Tech. Bulletin 5, 1944. H. Sommer: Market milk and related products, published by the author, 745 pages, 1946.

of their method of increasing by giving off bud-like outgrowths, these are sometimes likened to lily bulbs by those who use them.

Home-made fermented milk can be prepared by inoculating fresh milk with these bulbs, which can be taken from the bottom of vessels of fermented milk. When the sour milk is ready, which is generally in about 24 hours, the grains ("bulbs") are removed and stored in a small amount of milk in a cold place until desired for further use. Buds which are separated from the parent mass will continue growing in the same manner.

NOTICES AND REVIEWS OF RECENT BOOKS

Emblem of Spring

ORNAMENTAL CHERRIES. Collingwood Ingram. 259 pages, illustrated by the author; indexed. Country Life, Ltd. London, 1948. 30/-.

Flowering cherries are becoming more and more recognized as one of the sights of spring, and their blooming time something to look forward to. They are easy to grow, and flower when only a few years old, and have proved successful to give color even in small gardens.

Not a great deal has been written in the English language about flowering cherries; therefore, "Ornamental Cherries," written and very well illustrated by Collingwood Ingram, is a most welcome book. It is not one of the very large folio books, so very nice to own but difficult to handle. Mr. Ingram's book is about the size of an average novel. In spite of this he covers a lot of ground, literally and horticulturally, because he has traveled in China and Japan to see the cherries growing in their native surroundings, and the many hybridized varieties in the courtyards of the shrines — and he grows them in his own garden in England.

Mr. Ingram writes about the great number of both the species and hybrid varieties, describing how the wild, or species cherries are so much better planted among other trees, particularly coniferous ones, where the dark green of the evergreen foliage shows off the delicate beauty of the flowers.

There is a chapter on dwarfing trees, which subject seems to interest many people; as well as chapters on planting, diseases and pests, general history, and folk-lore. The main part of the book, however, is on the individual trees, their identification and source.

ALYS SUTCLIFFE,
Acting Horticulturist,
Brooklyn Botanic Garden.

Lily Society's First Volume

THE LILY YEARBOOK of the North American Lily Society. George L. Slate, Editor. No. 1, 125 pages, illustrated, bibliographical footnotes. Published by the Society at Geneva, New York, 1948. $3.

This newly formed organization has set an enviable standard with its first yearbook. Breeding is the dominant theme with accent on propagation by seed rather than vegetatively. Inevitably there are discussed the difficulties caused by sterility and persistent failure of progeny of cross-pollinations to give evidence of hybridity. Significant contributions to these problems are two papers on chromosome morphology and a paper on applying hormones at times of pollination.

Commercial production is well presented; one writer urges the society

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Diseases and Pests of Ornamental Plants

By Bernard O. Dodge and Harold W. Rickett
of the New York Botanical Garden

Covers 600 Plants, Trees and Shrubs

FOR EACH PLANT it shows: the diseases and pest symptoms—what causes them—and the proper method of control. Additional information on the nature of plant enemies and why certain remedies are prescribed provides a basis for adapting recommendations to special conditions if necessary.

Use this authoritative book as insurance against loss of prized ornamentals, to help you grow healthier and better-looking plants, and make less troublesome selections for cultivation. 200 excellent illustrations, complete index, 638 pages, $6.00

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The Green Earth

Harold W. Rickett. Discussing both the practical side of plant life—its structure, growth and purpose—and its beauties, the author shows how man depends on plants for survival itself, and weaves the whole into a story to charm every reader. $3.50

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Mulford and Racine Foster. Share the excitement as the Fosters tell of their experiences in the Brazilian jungles in search of more beautiful orchids. Read about plants that do not depend upon the soil—the giant air plants. You'll find beauty, danger and practical information in *Brazil.* $3.50

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to subject all new lilies to field-testing as a prerequisite to registration and endorsement.

Some of the best of the new hybrid seedlings are illustrated and described in detail. There are notes on lily culture in various states and regions of this country, and reports on species in English and other foreign gardens.

JOHN F. ZUR,
Men's Garden Club of New York.

Flowering Bulbs of Every Kind

BULBS FOR HOME GARDENS. John C. Wister. 270 pages, illustrated, indexed. Oxford University Press, New York, 1948. $5.

John C. Wister's "Bulbs for Home Gardens" revises and brings up to date his older book, "Bulbs for American Gardens." Although, according to the jacket, it is designed primarily for the amateur, it has much to interest the specialist too.

The book gives culture for bulbs, indoors and out, types of bulb gardening, and lists of species and varieties. (Though some will be sought from nurseries in vain, there are plenty of others available.) There are bulbs for the rock garden, the wild garden, long lists of tulips, daffodils and hyacinths, lilies and gladioli,—all of our favorites and would-be favorites.

The author urges amateurs to try new kinds of bulbs or new varieties, in order to widen our field of interest, not forgetting that the older,well-tried kinds will continue to be the principal inhabitants of our gardens.

When one surveys our many dismal August gardens, victims of heat and laziness, one might help them over the hot dry time by planting more of the half-hardy summer-flowering bulbs described, galtonias or summer-hyacinths, tigridias, kniphofias, montbretias, or the tender ones such as *Hymenocallis (Ismene)*, callas in a damp spot, agapanthus, blue or white in tubs, vallota, *Amaryllis belladonna* (now *Brunsvigia rosea*), and some of the watsonias. We should be thrilled by the results.

Dr. Wister grapples with the daffodil classification, giving the present one used by the Royal Horticultural Society but looking forward to the new one, to be used after January 1, 1950. It will be

simpler but one is a little sorry to see the incomparabilis, the Barrii and the Leedsii names go into the silences.

Just a note from a hobbyist. *Gladiolus primulinus* did not get its common name, Waterfall Gladiolus, because it likes a specially swampy ground, but because it was found first near Victoria Falls, where it grows on a tall, almost unscalable rock formation. The truly damp-loving gladiolus is the Marsh Afrikander (*G. tristis*), which loves to have wet feet.

SARAH V. COOMBS.

Doctor in the Congo Jungle

ON THE EDGE OF THE PRIMEVAL FOREST and **MORE FROM THE PRIMEVAL FOREST.** Albert Schweitzer. 222 pages, illustrated. Macmillan, New York. 1948. $4.50.

Presenting only two short episodes in a life about which volumes have been written, Albert Schweitzer tells simply and modestly of his experiences in the first two of his many periods of service as a jungle doctor on the Ogowe river in the French Congo.

Combatting unbelievable difficulties in lack of labor and material, in a climate where extreme heat and dampness destroyed precious medicines and fostered foul diseases, he succeeded in building a primitive hospital and trained natives to act as assistants.

With his crude equipment he set to work to treat from thirty to forty patients a day, working not only on the bodies but on the ignorant minds of the sufferers.

Dr. Schweitzer tells us that equatorial Africa has never at any time had a good stock of food plants. The banana, the manioc, yam, and the oil palm were all introduced from other regions, by the Portuguese.

Magnificent timber trees — mahogany, ebony, rosewood, coralwood and ironwood — abound, but are extremely difficult to cut and transport from the swampy, tangled jungle where they grow.

The entire book is fine reading, revealing, as it does, the rare personality of a man of unpretentious courage based on a desire to relieve pain and to practise the religion which he had formerly preached.

HELEN M. WOODWARD.

Guide For Middle Westerners

KANSAS WILD FLOWERS. William Chase Stevens. 463 pages, illustrations, glossary, index. University of Kansas Press, 1948. $7.50.

This superbly illustrated account of nearly 700 of the commoner wild flowers of Kansas should be useful to amateurs throughout the Middle West. The introduction and glossary are directed to the needs of those without botanical training, so that technical terms necessarily used in the descriptions and in the keys for identification should be plain to all. Both common and scientific names are given, as well as the derivation of the scientific names. There are numerous interesting comments on history, uses, habitat, methods of pollination, and other pertinent items. Most of the species are illustrated with one or more excellent half-tones, carefully selected to show the diagnostic features. One might wish that the size of the coarse grid background used for many of the pictures had been indicated, or the scale marked in some other way, but even so the illustrations as a group

The Last Refuge of Sanity?

Ecuador and the Galápagos Islands

by Victor Wolfgang von Hagen

author of *Maya Explorer*

IS IT a fertile land of untold resources — or a paradox where ancient civilizations battle with new? This stimulating, informal book recreates its colorful past — where von Humboldt sailed along its shore . . . where Darwin conceived his theories . . . rubber, quinine, platinum were discovered. Here, too, are the people of Ecuador today: the head-hunters, the hat makers, and the sophisticated residents of Quito. A "must" for anthropologist and botanist.

***Illus.*, $3.75**

At all bookstores

University of Oklahoma Press

are far superior to any I have previously seen. The author has evidently missed some recent taxonomic and nomenclatural work, and one might question the wisdom of dividing the *Compositae* into 11 families, but these and some other minor defects are not important in a treatment prepared for popular rather than professional use. The book is as far superior to others of its type, as Deam's Flora of Indiana is to other state floras prepared for the more advanced student.

ARTHUR CRONQUIST,
State College of Washington.

What Shrub Is This?

THE IDENTIFICATION OF TREES AND SHRUBS. F. K. Makins. 382 pages, illustrated, indexed. Dent, London, and E. P. Dutton & Co., New York. Second edition, 1948. $6.

In this new edition, Mr. Makins, a professional forester and trained botanist, has added many plants and several useful features to his unique and valuable book, which furnishes a way to identify 1,732 species of woody plants by non-technical means. Amateur gardeners and others without a scientific background in botany will appreciate the value of his ingenious system of a simple *one-page* key leading to 128 well-filled pages of drawings. The drawings, in turn, direct one to brief and concise descriptions of species in 552 genera, but the sketches include such a wealth of diagnostic detail that specific identification can often be reached without resorting to the descriptions except for verification.

Although the species treated are native and cultivated in the British Isles, the book is also useful for gardeners in the United States. Many subjects, of course, can be grown only southward from Virginia, but also included are many hardy plants which would be distinctive additions but are virtually unknown in northern gardens. Both names and drawings will surely prove stimulating to those who have a bent for the fascinating hobby of raising new plants from seed or buying them for trial in their own gardens.

B. C. BLACKBURN,
Gladstone, N. J.

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The Rules Reprinted

INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE. W. H. Camp, H. W. Rickett and C. A. Weatherby, editors. 118 pages, indexed. Offset edition from Brittonia **6**: 1 120. 1947. Chronica Botanica Co., Waltham, Mass.; Stechert Hafner, New York, 1948. $3.50.

The compilation and publication, in 1947, of an up-to-date though unofficial edition of the International Rules of Botanical Nomenclature by the American Society of Plant Taxonomists has amply justified itself in the fact that the edition soon became exhausted. The strong interest in correct plant nomenclature has apparently been sufficient to warrant an offset reprinting of this edition by Chronica Botanica Company.

Botanists had long been without individual copies of the International Rules, for vicissitudes of war and other factors have delayed publication of the decisions made at the Amsterdam Botanical Congress (1935) even after 13 years, and the Cambridge (1930) edition has long been unavailable.

In the 1947 compilation, the arrangement of the main body of the text follows the sanctioned order of the Cambridge code, with additions from the Amsterdam Congress clearly inserted in boldface type, and with editorial comments placed in footnotes. This style of set-up, along with the indices to all conserved and rejected names and to general content, makes the new work infinitely more usable. These features should be carefully examined and perhaps adopted and enlarged upon by the editors of the next official edition. There is no doubt that the rules will, in the future, command more respect and be followed more scrupulously if the exasperating obscurities of previous edi-

tions can be avoided. Usable indices are one way of accomplishing this.

Chronica Botanica Company is to be commended on the service rendered to botany in the continued availability of the 1947 edition of the International Rules.

F. R. FOSBERG,
Falls Church, Va.

Insect Identification Simplified for the Novice

THE INSECT GUIDE. Ralph B. Swain. Illustrations by SuZan N. Swain. 261 pages, index, bibliography, chart of orders. Doubleday, Garden City, N. Y. 1948. $3.

Dr. Swain has arranged this excellent guide to meet the needs of the novice in insect collecting, the back-yard gardener, and the naturalist. Inside the front and back covers are clear identification charts of all orders of insects. Illustrations in color give one or more examples of each order, some with the young, their nests, or eggs. These plates are keyed to descriptions.

This little book should stimulate the amateur. Because Dr. Swain is able to simplify his subject it will not overwhelm the reader who is beginning to find interest in insect life. For further study there is a bibliography divided according to special interests.

A guide of this kind should be a "must" for the flower grower or vegetable gardener. As the author points out, too often insects are looked upon as pests, whereas many of them are essential to the welfare of our plants.

HOWARD ROGERS.

Symposium in Plant Physiology

VERNALIZATION AND PHOTOPERIODISM. A. E. Murneek & R. O. White, and others. 196 pages, illustrated, indexed. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York, 1948. Volume 1. $4.50.

This international symposium is by the editors and 13 collaborators and covers the influence of light, temperature, and hormones upon growth and development of plants. Breaking of dormancy of seeds and initiation of flowering are two of the responses most studied. The book is recommended to all who are interested in this aspect of plant physiology.

F. W. KAVANAGH.

An Ancient Fruit In Present-Day Cultivation

THE FIG. Ira J. Condit. Foreword by Walter T. Swingle. 222 pages, illustrated, indexed. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, New York. 1947. $5.

The chapter headings are: The Fig in Song and Story, History and Distribution, Systematic Botany, General Botany, Caprification, Fig Breeding, Fruit Characters, Fig Varieties, Some Fig Districts of the Old World, Other Fig Districts, Climatology, Propagation, Fig Products, Chemistry and Food Value, Economics and Marketing, Diseases, Insects and other Pests. There is also a bibliography.

The author's aim has been to collect into one volume the essential facts about figs from ancient times to the present. This book includes the results of his study and research for the past 30 years in California. The reviewer finds that he has produced an outstanding volume which will be of particular interest to botanists and horticulturists, as well as to growers and processors of the fig.

GEORGE S. JAMIESON,
Washington, D. C.

Notes, News, and Comment

Botanical Congress. To serve at the Seventh International Botanical Congress, to take place in Stockholm, Sweden, in 1950, Drs. W. J. Robbins and B. O. Dodge have been named Vice-Presidents of the Section of Mycology and Bacteriology; Drs. H. W. Rickett and W. H. Camp have been appointed as Vice-Presidents in the Section on Nomenclature; and Dr. Donald P. Rogers has been named to a special committee for fungi.

Among the botanists appointed to serve on a special committee to deal with *nomina specifica conservanda* at the Congress in Stockholm are Drs. H. W. Rickett and Donald P. Rogers. This committee was selected at the International Conference on Botanical Nomenclature and Taxonomy held in Utrecht in June 1948. Among others in this group of twelve are Dr. E. D. Merrill of Jamaica Plain, Mass., former Director of the New York Botanical Garden, also Dr. Carl Skottsberg of Gothenburg, and Dr. H. J. Lam of Leiden, both of whom have been recent visitors at the Garden.

Staff Conferences. Supplementing the introductions made at the staff conference in January, when Dr. William J. Robbins presented members of the physiological laboratories to the rest of the scientific staff, on Mar. 15 Dr. H. A. Gleason, as Head Curator, explained some of the history and traditional work of the New York Botanical Garden and made the laboratory staff acquainted with the taxonomists and others on the second and third floors.

At the conference of Feb. 18, Dr. H. N. Moldenke gave a report of his four months' South American trip, during which he attended the Second South American Botanical Congress in Tucumán, Argentina, in October.

Technical Assistant. John J. Wurdack arrived at the New York Botanical Garden Feb. 8 and at the same time enrolled as a graduate student in botany at Columbia University. He has been appointed a technical assistant on a two-year fellowship provided by an anonymous donor for purposes of taxonomic research. His work will be in tropical botany. Mr. Wurdack was graduated from the University of Pittsburgh in 1942 with a bachelor of science degree in botany. Since that time he has spent five and a half years with the United States Army, on assignments that took him as a sanitary engineer to eastern Brazil, Panama, Guam, and Japan. Subsequently, he enrolled at the University of Illinois, where he completed requirements for a B.S. degree in sanitary engineering only a few days before coming to the Garden. His botanical collections from Brazil and Japan are deposited in the Carnegie Museum, Pittsburgh.

Lectures. Dr. B. O. Dodge addressed the Botany Seminar at the University of Pennsylvania Mar. 15 on "Species of *Neurospora* and the Evidence for the Origin of *N. tetrasperma* and *N. sitophila.*" Dr. W. H. Camp spoke in Philadelphia Mar. 5 at the Academy of Sciences on the concepts of the genetic structure of the species, as presented by Camp & Gilly in a paper published in *Brittonia* in 1943. Dr. H. N. Moldenke lectured on "Plants of the Bible" before 300 members of a church guild in Plainfield, N. J., Mar. 1, and at the Presbyterian Home for the Aged Mar. 16. The Luther Burbank Garden Club of Yonkers, an Affiliate of the New York Botanical Garden, heard Dr. H. W. Rickett Mar. 9 on "Gardens of Cloister and Castle." Richard S. Cowan spoke on "Plants of Hawaii" before the Fordham Journal Club Mar. 2, and in February he was interviewed on the New York Botanical Garden by Rev. Charles A. Berger, head of the biology department, over Fordham's FM station.

Mexican Anniversary. Dr. H. W. Rickett has been invited to contribute a paper to the special number of the Anales del Instituto de Biologia, Universidad Nacional de México, in observation of the twentieth anniversary of the institution. Dr. Rickett spent the summer of 1943 in Mexico, chiefly doing research in the National Archives, one result of which was the publication in 1947 of "The Royal Botanical Expedition to New Spain" — an account of the lives and travels of Sessé and Mociño and their colleagues.

Visitors. Dr. Ruth Patrick of the Philadelphia Academy of Sciences, who was in the city to give a lecture before the New York Microscopical Society,

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Chrysanthemum, *Carnival*. This brilliant mum is a glowing bronze, red and gold shade that fairly gleams.

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Hardy English Aster, *Plenty*. Thousands of semi-double 2″ flowers of exquisite, soft blue completely cover this fine, hardy plant. Will grow anywhere.

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Plenty

California Centennial. Vigorous grower. The most radiant, deep, crimson rose ever introduced. Velvety petals are amazingly heavy — will not fade or turn blue.

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Wayside Gardens

visited the Garden Mar. 4 with John H. Wallace and John Ward, also of the Academy.

In the first half of March Dr. Julian A. Steyermark of the Chicago Natural History Museum spent a week in the herbarium checking records of early collections of plants that are reputed to be but believed not to be in the state of Missouri.

Among other visitors have been Ralph B. Swain of the Bureau of Entomology & Plant Quarantine at Hoboken; Eugene Roberts, School of Medicine, Washington University, St. Louis; Otto Rahn, Professor of Bacteriology at Cornell; G. Morel of the Biological Laboratories, Harvard University, formerly from the Laboratoire de Biologie Végétale, at the Sorbonne, Paris; Roberta Ma, U. S. Dept. of Agriculture, Beltsville, Md.; Caroline K. Allen, Pawling, N. Y.; and Lindsay S. Olive of Louisiana State University. Dr. Olive has been appointed as Associate Professor of Botany at Columbia University, starting next September, to succeed Dr. J. S. Karling.

Clematis Prints. A gift of 77 prints of *Clematis* species and varieties in color, 57 of which are mounted, has come to the New York Botanical Garden's library from Miss Mabel Choate. They were exhibited at the Garden March 17 at a meeting of the Advisory Council, of which she is a member. Dating from 1737 on, the illustrations have come from ten different publications, including Paxton's *Magazine of Botany,* Maund's *Botanic Garden,* "L'Illustration Horticole," and "Choix des Plus Belles Fleurs" by P. J. Redouté.

Advisory Council. Elizabeth C. Hall addressed the Advisory Council of the Garden at a meeting in the Members' Room March 17, speaking on botanical exploration in South America through the centuries Miss Hall exhibited rare books from the Garden's library dealing with some of the early explorations on that continent and recent reports of travels, particularly botanical expeditions. A list of 86 books for background reading in botany for travelers in Central and South America and the West Indies was mimeographed and distributed to all present.

Meetings. Dr. William J. Robbins attended a meeting of the Council of the National Academy of Sciences in Washington Feb. 3 and a meeting of the committee on research of the American Philosophical Society Feb. 25 in Philadelphia.

California Seminar. During the first week of March Dr. Robert S. de Ropp conducted a seminar in plant tumors at the California Institute of Technology at Pasadena. While in the West he also visited Stanford and the University of California.

Instructions Mimeographed. In addition to the mimeographed information on the raising of *Azalea Schlippenbachii* from seed, announced on page 72 of the March Journal, the New York Botanical Garden now has available instructions for the drying of flowers in borax to preserve their natural form, as given in the Journal for June 1943, and for making pictorial compositions with pressed plants, as explained in the Journal for December 1946. The azalea material first appeared in the Journal in April 1944. The Garden's stock of all three of these issues has been completely exhausted. The mimeographed leaflets will be mailed upon request at five cents each.

Downtown Lectures. A series of invitation lectures arranged by the Botanical Garden's downtown office was presented to a limited audience at the home of Mrs. Thomas J. Watson on four consecutive Thursdays beginning Jan. 13 Under the general title of "Your Gardening Troubles," the series consisted of talks by Dr. P. P. Pirone on "Persistent Pests" and "Common Plant Diseases," James B. Jack on "Problems of the Soil," and T. H. Everett, who directed the series, on "General Problems of the Garden." Mrs. John D. Beals and Mrs. Melvin E. Sawin served as co-chairmen with Mrs. Donald Scott as vice-chairman

Benefit. Funds were added to the New York Botanical Garden's endowment through a benefit performance of "Kiss Me, Kate" at the Century Theater Jan 10. The affair was arranged by the Garden's downtown office, with Mrs Harold Ruckman Mixsell as chairman and Mrs. H. Harvey Pike and Mrs Philip B. Weld as co-vice-chairmen, supported by a committee of thirty Garden members.

THE NEW YORK BOTANICAL GARDEN

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

Membership in
THE NEW YORK BOTANICAL GARDEN
and what it means

TO THE INSTITUTION, membership means support of a program that reaches several hundreds of thousands of persons annually.

Briefly, this program comprises (1) horticultural display, (2) education, (3) scientific research, and (4) botanical exploration. To further this work and to disseminate useful information about plant life to the public, the Garden issues books and periodicals, both scientific and popular, and presents lectures, programs, radio broadcasts, and courses of study in gardening and botany. The laboratories and large herbarium and library serve the staff in its research and educational work, while the extensive plantings at the Garden give the public vistas of beauty to enjoy the year around. The public is also free to use the Botanical Garden's library, and, under direction, to consult the herbarium.

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* * * *

Garden clubs may become Affiliate Members of the New York Botanical Garden, and thus receive certain privileges for the club as a unit and others for individual members. Information on Garden Club Affiliation will be sent upon request.

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* * * *

Classes of membership in the New York Botanical Garden in addition to Industrial Memberships are:

	Annual Fee		*Single Contribution*
Annual Member	$ 10	Member for Life	$ 250
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Contributions to the Garden may be deducted from taxable incomes.

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I hereby bequeath to The New York Botanical Garden, incorporated under the Laws of New York, Chapter 285 *of* 1891, *the sum of*_____.

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All requests for further information should be addressed to The New York Botanical Garden, Bronx Park, New York 58, *N. Y.*

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

MAY

1949

IN THIS ISSUE:

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PEONY PESTS AND DISEASES

LICHENS AS DYES

A DWARF SPRUCE NAMED

SOWING GRASS BY SPRAYING SEED

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VOL. 50 NO. 593

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MAY AND JUNE EVENTS AT THE GARDEN

May 2—*Garden Party* for wives of delegates to the United Nations, given by the Advisory Council, 3 to 5:30 p.m.

May 4—*Garden Club Day* for members of the Garden, the Garden Club of America, and all Federated Garden Clubs in the vicinity of New York, given by the Board of Managers, 11 a.m. to 3 p.m. Four members of the staff—E. J. Alexander, T. H. Everett, Elizabeth C. Hall, and P. P. Pirone—were scheduled to be on hand for consultation during the morning, and a guided tour of the grounds was arranged for the afternoon.

May 10—*Wilmington Tour,* to visit the gardens of Mr. & Mrs. Henry F. du Pont and Mr. & Mrs. Francis P. Crowninshield, arranged by members of the New York Botanical Garden for members of the Federated Garden Clubs.

May 26—***Board of Managers Day,*** combined with Members' Day. At 2:15, after a private luncheon for the Board of Managers, the annual meeting of the Corporation of the New York Botanical Garden and the Board of Managers will take place, with a brief report by *William J. Robbins,* Director. At about 2:30, *Henry Teuscher,* Curator of the Montreal Botanical Garden, will give a talk on the new ***Montgomery Conifer Collection,*** which has been planted at the south end of the grounds, and will christen a unique dwarf blue spruce in the collection as *Picea pungens* variety *glauca,* clone ***R. H. Montgomery.*** *Colonel Robert H. Montgomery* will then make formal presentation of the entire conifer collection, which will be accepted for the New York Botanical Garden by *President Joseph R. Swan.* Members will adjourn to inspect the new planting, then will return to the Members' Room for tea at 4 p.m.

June 9—***Rose-Growers' Day,*** combined with Members' Day and arranged in co-operation with the American Rose Society. Included in the program, which will take place between 11 and 3, will be a talk on "Exhibiting Garden Roses" by *Edward J. O'Keefe*; a demonstration of "Roses for Personal Use" by *Ann Hagan*; instructions on "Keeping Japanese Beetles out of the Rose Garden" by *W. E. Fleming*; a talk on "Choice Roses Among the New Varieties" by *A. H. MacAndrews*; and a symposium on rose culture to be led by *Everett A. Piester,* in addition to the annual tour of the Rose Garden led by *L. C. Bobbink* and his associates.

FREE SATURDAY AFTERNOON PROGRAMS

3 o'clock in the Museum Building

May 7	***English Country Homes and Gardens***	*James Fear*
May 14	***Nomads of the Jungle*** (Malaya) and ***Tropical Mountain Land*** (Java)	Two motion pictures by Victor Jurgens
May 21	***Garden Flower Quiz***—With prizes offered by the Botanical Garden	

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CAROL H. WOODWARD, Editor

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A Succulent Enthusiast in Nyasaland

By Harold E. Anthony

A SUCCULENT fan is a plant lover who has become infected with an insidious virus. He has not necessarily lost his appreciation of the normal, run-of-the-mill plants, but he has discovered a keen interest in a wide variety of specialized vegetation, some of which blooms in spectacular fashion and some seldom or never flowers but develops striking growth habits of stem or foliage. Many succulents are as near fool-proof to grow as a plant may reasonably be; others are intolerant of neglect, but practically all of them are resistant to long periods of drought if certain other conditions are met. These characteristics make it possible for the succulent enthusiast to select plants which survive and even prosper on windowsills, in sun or in shade, in the attic or basement over winter, and in other situations which would be fatal to most plants. Such spots are forced upon the person who lives in regions of cold winters, *sans* a greenhouse; but where winter brings no frost and plants can stay outside the year around, happy homes may be found for so many different species that the field of selection is beyond the capacity of an individual.

The insidious nature of the succulent appeal leads the victim from simple beginnings into expansions that make the average home bulge at the seams. It is very easy to make the start. Most of the big chain stores, the five-and-tens, have plant counters. Some of these have a surprising variety of succulents and at low prices. The first few cacti, crassulas, aloes or euphorbias go on a windowsill or on a table in a bay window. They do so well that others are added. Windows give out and all too soon the succulent enthusiast has no room for more pots, while at the same time he can discover in the happy hunting grounds of the five-and-ten oh, so many kinds of plants he has not yet tried!

As one who has been through all the growing pains of becoming a succulent fan, even to the stage of acquiring a small lean-to greenhouse (which should have been built with accordion pleats), I can attest to the

easily accessible and subtly tempting succulent assortments to be found in so many of our variety stores. And having scrutinized commercial sources exhaustively and spent long hours in the ranges of the New York Botanical Garden poring over species not available to commerce, I found myself eager to view any succulents encountered by the Vernay Nyasaland Expedition, of which I was a member. My specialized field of interest is mammals, but there was ample opportunity to survey the flora while I was running my traps or carrying a gun.

Nyasaland is not situated in that part of Africa which is the environment for the richest succulent flora. Nyasaland lies at the southern end of the Great Rift Valley and its topography is largely mountains alternating with valleys. The climate varies from very wet, in the rain forests, to very dry in the low Shire Valley. Samples of many of the important succulent phyla occur there, but there is nothing like the great numbers of species to be encountered in South Africa. Nevertheless it meant a great deal to discover, from time to time, some plant of obvious succulent habit, growing in its own environment and not potted or exiled to a foreign strand. I was fortunate in the fact that our party included Leonard J. Brass, a trained botanist, who was in every way a most congenial traveling companion.

Although the greatest display of succulents in Nyasaland* is provided by the aloes, most of these plants can be grown only outdoors in a suitable climate or in a large greenhouse. Therefore to me the most interesting succulents found on the expedition were the species of *Crassula,* which are small enough to be grown on a windowsill or in a sunny living-room.

The genus *Crassula* is very large and includes many of the plants commonly seen in window gardens. These may display great variety in habit of growth, in foliage, and in flower. In Nyasaland all of the crassulas we saw growing wild were similar in form, perhaps all subspecies of the same stock. We first saw one of these plants on the upland of Zomba Plateau.

Here there are low tight clusters of rosettes growing on the rocks and there appear to be two varieties, differing at first glance only in the size of the leaves, which are plump, covered with fine down, and set so closely on the short stems that they overlap like shingles. The flower spikes arise from the center of the rosette, are low, and carry a small globular head of florets. These are a delicate pink in the bud but open white. We did not see these crassulas in abundance on Zomba but when we moved up onto Mlanje they, or a very closely related race, were found to be very common.

It is a stiff climb from the base of Mlanje to the summit of the plateau, about three hours to ascend four thousand feet along a trail that rambles

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*For illustrations of this region see L. J. Brass's article in the Journal for May and June, 1948, particularly page 112 in the May number. For an earlier article by Dr. Anthony, also based on the Vernay Nyasaland Expedition of 1946, see "How *Rhipsalis,* an American cactus, may have reached Africa" in the Journal for February 1948.

Two forms of a dwarf crassula from Zomba plateau. Placed side by side, they exhibit the great difference in the size of their leaf rosettes.

over rocky slopes in order to avoid the sheer escarpments. Eventually the path reaches the crest of a barren, rocky ridge, crosses the divide, and the traveler is confronted with sweeping grasslands that dip and swell to skyline ridges. The topography is that of a vast amphitheatre and the section where we established our base is the Luchenya Plateau.

In many ways our three weeks' stay at the cottage placed at our disposal here by the Forestry Service of Nyasaland was the high spot of the expedition. The plateau was interesting both faunally and botanically, and the environment, with its heavy rainfall, frequent low-lying fogs, and complete separation by high escarpments from the basal plains, is unique in Nyasaland. It was here that Brass and I began to really know our native boys, a good lot in the main but with many child-like attributes. Very few of them spoke English. Others knew but a few words although these were put to skillful use. It was amusing to see the workings of their minds.

The tracks and rootings of the wild pigs provided a good example. The native did not know the English for pig but that was no handicap. My man Friday answered to the name of Ike, an approximation of his native name. "Ike, what animal did that?" "Bwana, him make all a same bacon." "When did he do this?" "This work next week." And why not? Last week is just as "next" to this week as the one yet to come.

The small crassula that we were observing occurred in great abundance on the Mlanje Plateaus up to elevations of 7,000 feet, at least, where we

A crassula on Mlanje plateau at 7,000 feet elevation has foliage so tightly packed that stems are rarely visible.

saw ice crystals in damp spots before the morning sun could strike. In the shade the leaves were larger and darker green than in the open. In exposed situations where the sun and rain could work their will, the plants were dwarfed and the foliage often brightly colored, a purplish red. Frequently the roots were anchored in rock crevices or as a surface sheet over unbroken rock. Many times I saw plants growing on the trunks of trees, lodged in the crotches of limbs, or plastered on the sloping or vertical faces of huge rocks. Some wag has said of our Rocky Mountain goat which frequents skyline ridges above timber-line that this animal lives on rocks and mountain scenery. Following this line of logic, if such it is, one might say that the Mlanje crassula lives on air and scenery. Certainly there is plenty of these for the plants, but soil is often so scarce as to be a neglible item.

A third station where this plant was found is Chenga Hill, a good two days' drive by truck north of Mlanje Plateau. On Chenga, the crassula grows under sunny skies and endures a long dry period with no rain for weeks on end. There is a marked contrast between this environment and fog-drenched Mlanje. It exemplifies the adaptability of this species that it appears to thrive in both places.

These tiny succulent plants are beautiful, not only when the attractive buds and flowers are present, but when only the thrifty, orderly foliage is to be seen. This crassula should be a pot plant *par excellence* for the succulent fan. Incidentally, it is thriving in the ranges of the New York

Botanical Garden. Cuttings survive for months if left lying about and root readily when given soil and water.

Most of the other Nyasaland succulents we encountered were robust individuals, too large for indoor culture. It was a privilege to see them growing in the wild, for the very sight of them here would delight the heart of any succulent enthusiast. Aloes, for example, thrive in Nyasaland, some of them growing in such numbers as to constitute an aloe forest. The euphorbias are numerous and they vary from the curious, leafless fish-poison tree, the slender green twigs of which carry the poisonous latex, to small prostrate plants rising only a few inches above the soil. Several species of *Bryophyllum* and *Kalanchoë* grow both as garden subjects and in the wild. The so-called "air plants" or "life plants" are members of this particular succulent assemblage and owe these names to their habit of developing tiny plantlets, complete with roots, on the margins of their leaves. From the impressive showing these two genera made in Nyasaland, I concluded that the average succulent fan does not give them the attention they deserve. Their prolific flower displays range from lavender and pink to vigorous red or orange. Moreover, the flowers are long-lasting and the plants are tolerant of neglect and lack of water. Although reaching a height of two or three feet in an open garden, cuttings in a pot could be restrained to indoor stature.

The Nyasaland euphorbias appeared to thrive equally well as natives or introductions from afar. As exemplifying this the poinsettia (*E. pulcherrima*), brought from Mexico, flaunted larger and brighter red bracts than I have ever seen at home, and the crown-of-thorns (*E. splendens*), native to Madagascar, was a colorful garden subject. But the Nyasaland euphorbia

On Chenga Hill, Nyasaland, the crassulas were flowering in September, brave in memory of rains long past or confident of rain as yet to come.

The robust stems of *Euphorbia ingens*, growing on a rocky hillside at Kasungu, in Nyasaland, display a precise and attractive pattern of ridges.

which most appealed to me as a welcome addition to a home collection was a tiny dwarf that popped up after the September fires. On a bare, cinder-blackened ridge near Nchisi, Brass and I found this plant making quite a show amid the early vegetation that springs to life at this time. Tight little clumps of green, close pressed to the ground, were plentifully sprinkled with chocolate to chestnut bracts among which tiny flowers made a white

On Mlanje plateau compact euphorbias, like careless children, often have wet feet. They prefer damp and oozy terrain. These plants resemble the species *E. heterochroma*.

eye. There was nothing spectacular about the color display but rather a dainty, trim appearance that led me to visualize this euphorbia as a splendid subject for pot culture. We dug up some and found the plants had plump roots, resembling a carrot in proportion and lack of fine roots but about the size of a pencil in cross-section. This species grows in soil that is hard and sun-baked for months at a stretch, and must have a long, dormant season. It was difficult sometimes to dig out a plant without breaking the root, so firmly was it packed in the rocky, adobe-like soil.

Only very young plants of the aloes we saw in Nyasaland would suit the limited quarters where flower pots are endemic. But, of the ten or more varieties we encountered, two should be outstanding in such a setting. Both of these were found on Chenga Hill as acaulescent types, the lower leaves touching the ground, without any bare basal stem. One is attractively spotted in the juvenile stage; the other has red leaves with a gloss so bright that they looked to be enameled. Whether this high coloring is limited to the dry season or is of annual duration, I can not say. The dark red flowers which appear only on mature plants are not essential to the striking appearance of this burnished aloe.

Diseases and Pests of the Peony

By P. P. Pirone

HERBACEOUS peonies are usually considered to be rather resistant to attacks by insect pests and fungus parasites. Although this is generally true, there are times when buds fail to open, leaves become spotted and blighted, or entire clumps die out completely.

Perhaps most familiar to all amateur and professional peony growers is the disease known as bud blight or bud blast. Writers on peony troubles usually ascribe this condition to infections by fungi belonging to genus *Botrytis* and the disease is called botrytis bud blight or bud blast.

Where the disease is definitely caused by botrytis infections, control can be achieved by sanitation—that is, removal and burning of the above-ground plant parts in the fall, followed by removal of heavy mulches early in the spring, provision of adequate air and water drainage around the clumps, and, in some cases, spraying the new growth several times at weekly intervals in late spring with a copper fungicide.

Unfortunately, however, bud blight often occurs in the absence of fungus infections and the measures outlined above fail to prevent the trouble. No one can definitely explain the cause of bud blight when botrytis fungi are not involved.

Several years ago I worked for a time on peony diseases at Rutgers University with my colleague Dr. O. W. Davidson. We concluded that blighting of peony buds could be caused by any one or a combination of three other factors.

Root infection by the root-knot nematode or eelworm was one. Dry spells and low temperatures during early spring comprised the second. Lack of potassium in the plant was the third factor.

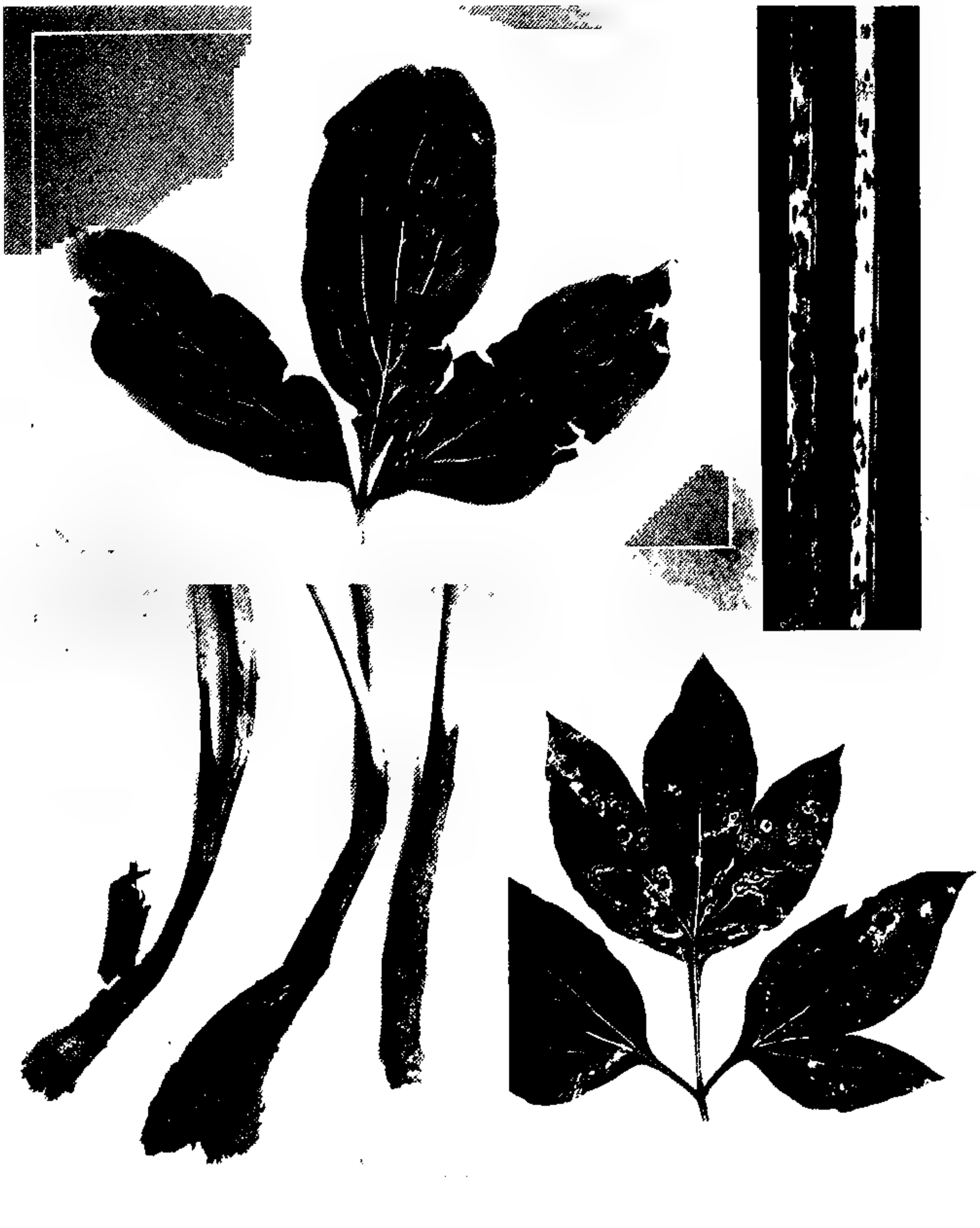
We noted, for example, that plants which showed severe bud blight in a 30-acre commercial field of peonies contained 1/8 to 1/10 as much potassium as was found in corresponding samples of the same varieties, which had no blighted buds, grown at Rutgers.

It is an established fact that a lack of potassium makes plants particularly susceptible to frost and freezing injury. We concluded, therefore, that non-parasitic bud blight may be caused by a combination of low potassium content in the plant and low temperatures in the spring.

More work on non-parasitic bud blight should be conducted with particular stress placed on cultural practices and nutrition.

Other Causes for Diseases

There are, of course, several parasitic fungi which we know are capable of causing diseases. Perhaps the most destructive is *Phytophthora cac-*



LEAF AND STEM DISEASES OF THE PEONY

Upper left: The fungus *Cladosporium paeoniae* causes dark purplish blotches on the leaves. *Upper right*: Oyster-shell scale on stems. *Lower left*: Peony stems showing black decay caused by the *Phytophthora* fungus. *Lower right*: This striking leaf pattern appears when peonies are affected by the virus disease known as mosaic.

torum (also known as *P. paeoniae*) which causes a root and stem decay. Parts infected by this fungus turn dark brown or black. The variety ***Avalanche*** appears to be particularly susceptible.

Because infections occur in the roots and lower portions of the stems, fungicidal sprays are of no value. Confirmed cases should be lifted out together with adjacent soil and thrown in the garbage can. Such material must never be placed in the compost pile. Planting healthy clumps in a new spot where the soil is well drained usually prevents further trouble.

Several fungi also attack the leaves. The fungus *Cladosporium paeoniae* causes the disease known as blotch or measles, in which dark purple spots appear on the upper leaf surface. On young stems, the infection appears as elongated reddish-brown streaks.

Removal of old tops in the fall or early spring before new growth appears usually suffices to keep this and other leaf diseases in check. Where serious infections have occurred the previous year, it may be necessary to spray the newly developing stems and foliage several times in spring with a copper fungicide at two-week intervals.

The virus disease known as mosaic occasionally affects peonies. Circular areas consisting of concentric bands of alternating dark and light green develop on the leaves. No cure is known for this disease. Infected plants should be lifted and burned to prevent spread to nearby healthy specimens.

Root Nematodes

Plants with many buds from which weak, spindling shoots develop, and with irregular, gnarled roots, are infested by nematodes. Small galls, the size of peas or smaller, may be seen on the young feeding rootlets.

Plants showing these symptoms can be freed of nematodes. If the clumps are old, they should be lifted in the fall and divided into smaller clumps each with three to five eyes. All galled roots should be removed, and each clump should then be soaked for 30 minutes in hot water maintained at 120 degrees Farenheit.

If young plants have nematodes, the treatment is the same except that they are not divided. Roots so treated will do best if planted in fresh soil. If they must be replanted in the old spot, new soil should be brought in or the old soil first be treated with a soil fumigant such as DD mixture.

Insect Pests

Few insects attack peonies and these rarely cause much damage. The rose chafer and the rose curculio occasionally feed on the flowers and buds of the late varieties. Spraying with a mixture of two tablespoonfuls of 50 percent wettable DDT in a gallon of water should control these pests.

The oyster-shell scale will occasionally infest peony stems. Removal and burning of heavily infested stems will keep this insect under control.

Ants are perhaps the most annoying insect on peonies. They cause no

direct injury for they merely feed on the sweet liquid exuded by the buds. There is no evidence that ants spread the botrytis bud blight fungus, despite the statements one finds to the contrary in gardening publications.

Ants can be easily destroyed by spraying infested plants and the surrounding soil with a very dilute mixture of water-miscible chlordane.

Summary

Besides the direct attack on the few pests and diseases mentioned in this article, peony growers should follow the cultural directions given in Harriette Halloway's excellent article in the September 1948 issue of this Journal, based on a talk which she gave on Members' Day at the Garden June 2, 1948. I can find no better advice on peony growing than that given by Miss Halloway in this paper:

"From good varieties, healthy stock, properly planted, easily cultivated, patiently awaited, peonies give rich reward."

Lichens As Dye Plants

By William F. Leggett

WHEREVER lichens grow on rocky seacoasts in warm temperate regions, there is likely to have been a home dye industry active, at least intermittently, since the earliest times. For it is from lichens that the purple dye called ARCHIL or ORCHIL, or by its French name of ORSEILLE, has been derived since ancient days. The plants used for dyeing woolens, mentioned by some of the classical writers, are believed to have been lichens, and it is also thought that when the prophet Ezekiel, in his lamentation foretelling the ruin of Tyre, said, "Blue and purple from the isles of Elishah was thine awning," he was referring to material dyed with the common lichen of the region.

Many centuries later, in "Romola," George Eliot described orseille as "a little lichen which grows on the rocks of Greek isles and in the Canaries; and, having drunk a great deal of light into its little stems and button-heads, will . . . give it out again as a reddish-purple dye, very grateful to the eyes of men."

Dyes from lichens can be used only on animal fibers — wool and silk; they have no effect whatever on cotton or linen. At best they are not entirely fast to light, so their use has declined, but they were important in many countries throughout many centuries. Today their principal use is in the manufacture of litmus paper, which is used for testing the acidity or alkalinity of liquids. This property of lichen dye to change its color from red to blue in the presence of an acid or an alkali has

About the Author

MR. LEGGETT, whose book entitled "Ancient and Medieval Dyes" was published in 1944 by the Chemical Publishing Company, contributed a series of articles on vegetable dyes to this Journal during 1943 and 1944. His historical study of madder appeared in April and May 1943; indigo, October 1943, woad, May, saffron, August, and safflower, November, 1944. Formerly associate editor of the *Textile Colorist,* now associate technical editor of *Rayon & Synthetic Textiles,* Mr. Leggett is also the author of books on linen, wool, silk, and other subjects.

long been known. In the Scandinavian countries and similar northern regions, where different species grow, yellow, brown, and rust colors are derived; but the lichen dye best known throughout the centuries is the red or purple of orseille.

The principal lichens used in the manufacture of orseille are *Lecanora tartarea* and *Roccella tinctoria.* They are different in form, *Lecanora,* an inhabitant of more northerly regions, being entirely crustose, with its minute reproductive organs borne on flat, button-like cups, while *Roccella* has erect wavy strands or branches on which the spores develop. *R. fuciformis,* similar in appearance and quality and occurring generally over the same area, and *Lecanora parella*[1], chiefly from the Mediterranean shores, are also sometimes used.[2]

In the New World dye lichens called ORCHILLA, which are a species of *Roccella,* have been found in abundance on the coast of Lower California, where attempts were made in the past century to develop an American orseille industry. The efforts were successful until the discovery of aniline dyes made the gathering of lichens no longer profitable.

The best lichen dyes in any region are said to come from plants which grow in well lighted, airy places, such as seacoasts provide.

Dyers of Ancient Days

In the remote past, peasant dyers of the Near East and the Mediterranean littoral used *Roccella* for simple coloring purposes whenever they desired a purple dye. Both Theophrastus and Pliny describe how this common lichen grew on rocks on various Mediterranean islands, notably Crete and Candia. Both writers added the statement that the plant was

[1] The classical name of *Lecanora* as it has been applied to *L. tartarea* and *L. parella* and certain other species has given place in recent years to the generic name of *Ochrolechia.* C.H.W.

[2] Other lichens known for the color they can produce include species of *Gyrophora* and *Umbilicaria,* flat papery types growing on rocks in colder regions, and *Pertusaria,* a small crustose group often found on trees in the tropics or on rocks in temperate climates; also *Parmelia perlata,* a foliose species with crinkled edges, known in many parts of the world; *Ramalina pollinaria,* which has short erect branches; and *Evernia prunastri,* a North American species, with often thread-like branches seen hanging from twigs.—C.H.W.

widely used for dyeing wool because, as Theophrastus said, when fresh, its color was so beautiful that it even excelled the ancient purple of Tyre.[3] Pliny records that dyers of his day also "gave ground" (that is, a preliminary cloth dye bath) to those more costly cloths which were afterwards to be dyed with Tyrian purple.

As a dyeing agent, orseille was used for centuries in the Near East, and was apparently not unknown to the Greeks (though they seem to have had no specific name for it). But the art of procuring the dye from the lichens was unknown in western Europe until the Middle Ages. It was then discovered about 1300 by a Florentine dye trader who not only carried on an extensive dye business with the Near East, in saffron, kermes and indigo, but who himself traveled widely in the Levant. He gained a monopoly of the lichen dye business, and he perpetuated his fame — and its — by adopting the patronym Oricellari (under a number of different spellings), which in the Tuscan tongue later became Rucellai, a family that provided many eminent Florentine scholars and statesmen during the next four centuries.

Florentine Supremacy

For many years dyers of Florence, and ultimately their rivals in Genoa and Venice, imported lichens from the Near East, solely for their own use. Because of the excellent reputation of Italian dyed cloth, these local dyers, in time, gradually built up foreign trade in orseille, or archil (orchil), dye paste, supplying it to English, German and Flemish cloth merchants. Apparently few French cloth dyers used it, for it is not even mentioned in the older French dyeing manuals, though by the 18th century it was well known to the French.

Italian dye traders held their traffic in the dye paste for about four hundred years, or until 1702, when the same lichen was discovered growing on the Canary Islands. Later it was located in abundance in Angola, on the west coast of Africa, and since then has been found in many other parts of the world. So avid were both English and Dutch cloth dyers to obtain the substance from this first new source, that an English traveler, writing in 1704, expressed surprise that Europeans "immediately upon arrival upon these [Canary] islands, sought after this lichen, with as much energy and skill as they did after gold in Spanish America, though they were not so well acquainted with the former as with the latter, before the discovery on these new islands." But English cloth dyers had no use for the raw material. They were accustomed to the paste form as previously supplied by Florence, and had never learned how to prepare it. The method, in fact, was a closely guarded secret; hence, discovery of orseille on the Canary islands, although welcomed as an

[3] Tyrian purple is derived from the shellfish *Murex brandaris* and *M. trunculus,* found along the Mediterranean coast.

independent source of supply, promised little immediate advantage, until, fortunately, the paste formula was divulged to the English by an Italian cloth dyer in London who in former years had carried on his trade at Florence. The method, once understood, is relatively simple, but may be puzzling at first because the color is not evident in the lichen itself, but must be brought out by special treatment.

Preparation of the Dye

After the lichens are gathered, they are carefully cleaned, washed, and dried to free them from extraneous matter. They are then pulverized in water. Ammonia from various sources is then added (stale urine often used to be used), and as the mass ferments, more ammonia is added, the mixture being frequently stirred in the meantime. It is important that atmospheric oxygen reach every part of the pulverized lichen. Color may be modified or heightened by the addition of alkalis. Chalk, gypsum, or other substances are added at the end of the process to give the dyestuff body.

In the pasty form the dyestuff bears the name of ARCHIL, but when subjected to a certain drying process, it becomes PERSIS, or PERSIO. In a powdery form it is known as CUDBEAR, a curious designation, derived from the Christian name of the man who invented the process, a Scotsman, Cuthbert Gordon. In his own country, all dye lichens are known as CROTTLES, from CROTAL, the Gaelic name for the plant, but the specific name of cudbear has belonged since his day to the powder form of the dye, and by extension has often come to refer to the lichen itself. In 15th century England the plant was also called CORK, from the Gaelic CORKIR [CORCYR] meaning scarlet.

Other Dye-Lichen Names[4]

Among the common designations for the dye-yielding lichens, besides the general names of orchella-weed and dyer's moss, are such geographic designations as Angola weed (for *Roccella tinctoria*); Canary moss (for this or for *Parmelia perlata*), and Swedish moss (for *Lecanora tartarea*); also Tartarian or tartareous moss (for the same), either because of its possible Mongolian origin (Tartar frequently being used in place of Tatar) or, more likely, because of its rough and crumbly, tartareous surface.

PERELLE, or PARELLE, derived from the French, is used for *Lecanora parella,* which yields principally a red or crimson dye often used in the preparation of orseille.

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[4] Further notes on the various names for the dye lichens, prepared by Carol H. Woodward, are scheduled to appear in a forthcoming issue of *Torreya* in the Bulletin of the Torrey Botanical Club.

A New Ornamental Dwarf Spruce

Identified and Described from the Montgomery Conifer Collection at the Botanical Garden

By Henry Teuscher

SOME thirteen years ago I saw a very handsome and interesting dwarf form of Colorado spruce at the Montgomery estate "Wild Acres" at Cos Cob, Connecticut. This same plant came to my attention again during a recent inspection of the new collection of conifers which the New York Botanical Garden has received from Col. R. H. Montgomery.

Nine years ago one of the head gardeners of the Montreal Botanical Garden, at my request, brought me 25 cuttings of it, which he had gathered at "Wild Acres" during a visit to the United States. Fourteen of these cuttings rooted and have since developed into beautiful little plants two feet high and rather symmetrical in outline. They are somewhat higher in the middle, since they are inclined to produce a pseudo-leader, though they show no inclination to become treelike. This habit, of course, renders the plants only the more attractive. The much older mother plant, now at the New York Botanical Garden and pictured in the accompanying photograph, shows the same outline.

To my mind, this clonal variety is one of the most desirable and most handsome of all dwarf conifers. The fact that it equals the normal Colorado spruce in hardiness, smoke resistance and the ability to thrive even in rather heavy neutral to alkaline soils, lends it additional value.

Most varieties of the Colorado spruce are notorious for being very difficult to propagate by cuttings, but cuttings of this variety as related above, rooted 56%. This is a very high percentage, if one considers that no special precautions were taken. If a gentle bottom heat of 50° to 55° is given, and if the air temperature is held down to 35° to 40°, it

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MR. Teuscher, formerly Dendrologist at the New York Botanical Garden, for the past thirteen years has been Curator of the Montreal Botanical Garden, which was built entirely according to his designs.

Last November he was invited to come to New York to identify the 200 specimens in the new collection of conifers presented to the Garden in 1947 by Col. Robert H. Montgomery and now planted on a landscaped knoll in the southern portion of the grounds.

will undoubtedly be possible to obtain much higher percentages of rooting. The rooting medium, by the way, should be kept very wet during the first three or four weeks.

As established through a check list of the Pinetum at "Wild Acres," compiled in 1934 by E. Dexter Davis, the original plant of this variety was obtained by Col. Montgomery from the Eastern Nurseries under

PICEA PUNGENS var. GLAUCA, clone "R. H. MONTGOMERY"

This newly named dwarf spruce is in the Montgomery Conifer Collection at the New York Botanical Garden. It is being officially christened on Board of Managers' Day at the Garden, May 26, 1949.

the name *Picea pungens glauca compacta globosa.* This name, however, is confusing and rather awkward; besides, it has never been published. Mr. Davis in his check list suggests that the Eastern Nurseries plant is probably identical with Rehder's *P pungens compacta.* This, however, is definitely not the case, since *P. pungens compacta* of Rehder is dark green in color, like the type of the species; not blue like our variety. Besides, it differs in habit.

In view of the fact that this variety can undoubtedly be propagated only vegetatively and, therefore, represents a clone, it should not be given a Latin name. Since Col. R. H. Montgomery seems to have been instrumental in saving this beautiful spruce from extinction — it is not known to be in cultivation elsewhere — it gives me great pleasure to propose herewith the name ***R. H. Montgomery*** for this clonal variety. A technical description of it follows.

Picea pungens* var. *glauca* clone *R. H. Montgomery* new clone. Very compact and slow growing. Annual increase about 6 cm. (2½ inches). Bud scales reflexed. One-year-old twigs pale yellowish brown, glabrous. One-year-old needles 10-12 mm. (about ½ inch) long, stiff and pungent, silvery-blue. Two-year-old needles 18-20 mm. (about ¾ inch) long, grayish blue.

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*Arbuscula compactissima; lente crescens, circa 6 cm. per anno. Ramulis glabris, languido aurei-bruneis; foliis rigidis et pungentibus, argentei-glaucis in anno primo, pullis in anno secundo.

Seeding Slopes Along Connecticut's Roadways

By John L. Wright

IN the highway field it is universally recognized that the immediate establishment of turf on the raw slopes and roadside areas resulting from road building is the most satisfactory method of controlling costly soil erosion and eliminating the ugly scars of construction.

But the conventional method of turf establishment, using large amounts of topsoil with fertilizer and seed, is far too expensive. The Connecticut Highway Department therefore started experimenting in the hope of finding satisfactory means of growing turf at a reasonable cost.

The first method which gave real promise was that of placing about six inches of loose hay mulch over the roughly graded slopes and raw roadside areas, and spraying over this mulch a thin mixture of loam,

fertilizer, seed, and water. An excellent turf resulted at a cost of about one-sixth that of the methods previously employed.

But this was not enough saving, so the department continued its experiments. It was observed that when loam was omitted from the spray mixture a much better spray pattern resulted and the mixture could be dispensed to a distance well over 50 feet from the nozzle. It was but a step to learn that such a mixture sprayed directly on the rough graded areas with the mulch superimposed, as well as when sprayed over the mulch, produced fully as satisfactory turf as did the mixture containing topsoil.

After numerous trials were run, varying the thickness of the mulch applied and spraying the seed mixture both below and above the mulch, it was decided that the best method for general roadside use, in Connecticut at least, was to spray the mixture directly onto the rough graded areas and cover with 2 inches (loose measurement) of hay mulch. This is now the standard practice of the Highway Department in all seeding operations, with the exception of a few places where property agreements may definitely call for different treatments.

The seeding machines now being used are each equipped with a 1,000 gallon, quarter-inch steel tank with built-in agitators for storing and mixing the spray materials, and a three-inch centrifugal pump assembly for furnishing the spray pressure and suction to fill the mixing tank with water. There is also a small two horsepower motor for operating the agitators; a 20-foot section of two-inch suction hose for filling the mixing tank; and a short length of 1½-inch hose with a one-inch fan-shaped nozzle for dispensing the spray material. The seed and fertilizer are placed by hand into the mixing tank through an 18-inch porthole located in the center of the top of the tank. The entire assembly is mounted on two 4-inch I-beam steel skids and can be carried readily on a six-ton truck.

The machine is capable of fertilizing and seeding 65,000 square feet of graded roadside from one filling in about twenty minutes. The even distribution of the seed and fertilizer far surpasses that of any manual or mechanical method ever employed by the department.

The rate of seeding used to date has been 3 pounds per 1,000 square feet, but future seeding will be half that amount. Unquestionably, with the excellent seed distribution obtained, 1½ pounds per 1,000 square feet will be adequate to produce a satisfactory turf.

* * *

The author is Director of Roadside Development of the Connecticut State Highway Department at Hartford.

NOTICES AND REVIEWS OF RECENT BOOKS

Building the Soil For Better Crops

MALABAR FARM. Louis Bromfield. 405 pages, drawings by Kate Lord. Harper & Brothers, New York, 1948. $3.75.

This is a discursive, repetitious book. It is primarily for those who have the leisure to wander, figuratively speaking, through a modern farm, watching the multifarious activities of the day, listening at times to stories of farm and animal life as told by those on the soil. Of more interest to the agriculturist, however, are the author's thoughts on farming and soil building, as expressed in chapters II, V, VI, XI, XIII and XIV.

Mr. Bromfield believes that the general farm (he is careful to state that he does not mean the small family farm) has outlived its usefulness and economic justification. "Because its gross income is not so high as that of the specialized farm doing one or two or three things expertly, efficiently and well," the general farm cannot afford a high degree of mechanization, and without mechanization, it is difficult for the general farm to compete on even terms with the specialist.

Mr. Bromfield devotes considerable attention to his successful building up of the thin, eroded soil of the four abandoned farms in Ohio which he has named "Malabar." He did this, he says, while raising a crop every year on 90% of the fields treated, in order to pay taxes and interest. Yet his method was an expensive one, involving the application of limestone, superphosphate, barnyard manure, and commercial fertilizer, plus the sowing of ladino clover and rye as green manure crops.

In discussing the organic — chemical fertilizer feud, he points out that the use of chemical fertilizer in quantities sufficient to feed current crops and leave a residue to build up mineral reserves in depleted soils does no harm to living organisms so long as there is sufficient decaying organic material in the soil to absorb the rainfall and feed these organisms. It is impossible, in his opinion, "to restore or even to maintain the fertility of a farm by the use alone of the barnyard manure it produces," as this would require so much livestock that feed would have to be bought; and he adds, "barnyard manure manufactured out of bought feed is the most expensive of fertilizers."

Though the author agrees with Malthusian theories of population, his final words are those of hope. "It is probable," he says, "that the science of agriculture has made more progress in the preceding generation or two than in all the history of the world up to then; yet we have really only scratched the surface of the mysteries."

GOVE B. HARRINGTON.
Katonah, N. Y.

Azaleas for North and South

AZALEAS, KIND AND CULTURE. H. Harold Hume. 199 pages, illustrated, indexed. Macmillan, New York, 1948. $3.75.

That Dr. Hume should have written such a comprehensive book on azaleas is no less than one would expect of such a well-informed authority. Though living and working in the Deep South he has not limited himself to the azaleas of that region but has been all-inclusive, paying as much attention to the iron-clad hardies of the North as to the many species and hybrids for the South and the greenhouse. He covers the field well and gives much valuable information on the botany and history of azaleas, their place in the landscape, suitability for different environments, soils, culture, and diseases. The book is well illustrated with black and white and some color plates and is good reading all the way through. It is a timely book, for interest in azaleas is growing rapidly and each day seems to bring new information concerning them. The magnificent Chauncey Beadle collection near Asheville, N. C., is well described in the February issue of *The Country Gentleman*. Another fine, though little known, collection of azaleas

and rare rhododendrons, well worth a trip, is that of Samuel A. Everitt on Shore Road, Huntington, Long Island.

EDMOND AMATEIS,
Brewster, N. Y.

Pictures Predominant

HOUSE & GARDEN'S PORTFOLIO OF FLOWER PRINTS. Richardson Wright, editor. Twenty-five flower prints, with notes. Simon & Schuster, New York, 1948. $7.50.

Immediately, when I looked through the lovely plates that Richardson Wright had gathered for this group of 25 colored copies of famous flower prints, and as the plates lie loose in a folder, I thought how fine they would be for someone with little wall space to use different ones in a frame that can be opened at the back. It would be as zestful as changing bouquets in a room.

Also, what a delightful gardening talk could be built around them about the history of flower painting and printing! The plates, wrapped individually in cellophane and backed with thin pasteboard, so they could lean against a wall, would be light to carry and fun for the audience to look at at their leisure. The short descriptions of the work and of the artist on the back are just right in length, and ought to stimulate many owners of the set to further reading on the subject, or start them on the always delightful hunt for the originals.

GARDEN FLOWERS from plates by Jane Loudon. Robert Gathorne-Hardy. 16 pages, illustrated. B. T. Batsford, Ltd. New York 1948. $2.00.

The minute I had finished reading Mr. Gathorne-Hardy's charming essay on Mrs. Loudon and other feminine botanical artists and illustrators, in the Batsford colour book with the reprints from some of her works, I rushed out and bought a few copies. I intend to read it out loud to some of my own garden club. What an appreciation of the ability and industry in the illustrating field it is! The Victorian plates are interesting to look at, but Mr. Gathorne-Hardy's appreciation of these women in his good text is the real charm and satisfaction. What fun, after reading the book and studying the plates, to start hunting some of these graceful flowers and enjoying them in the forms our grandmothers knew before the skilled hybridizers produced the sometimes unsatisfying, bombastic, stiff, oversized exhibition blooms of today. The paper of the book, which was printed in The Netherlands, is peculiarly pleasant to the touch, and the print is clear.

FLOWER ARRANGEMENTS. Caroline E. Peterson. 80 pages, illustrated. Studio Publications, New York, 1948. $7.50.

The best a book on flower arrangement can do is whet the appetite for the growth of one's own work, and lift one out of smug satisfaction with the eternally similar to new and pleasing changes, or greater creative ability in handling material. Although I do not personally care for many of Mrs. Peterson's arrangements, and feel that some of them would hardly stay fresh for an hour, I do appreciate and agree with her stated viewpoint in trying to break away from the too many arbitrary rules that have mushroomed through the art of flower arranging today, and seem to be sapping much of the originality and creative design of arrangers. Mrs. Peterson offers many new suggestions that would be interesting to try out in the reader's own medium and style.

OLIVIA ERDMANN KUSER,
Titusville, N. J.

Southwestern Scenic Wonders

THE INVERTED MOUNTAINS. Roderick Peattie, editor. 390 pages, illustrated, indexed. Vanguard Press, New York, 1948. $5.

This is the seventh in the series of volumes on American mountains edited by Roderick Peattie. In this book E. D. McKee of the University of Arizona, H. S. Colton of the Museum of Northern Arizona, and W. F. Heald, alpinist and explorer, tell of the wonders and beauties of the great canyons of our Southwest. While most of the book deals, naturally, with the Grand Canyon of the Colorado and with Bryce Canyon, there are also sections devoted to the Painted Desert, Petrified Forest, Canyon de Chelly, Zion National Park, and various adjacent areas of Utah and Arizona. There are chapters on the ancient plant and animal life of the region as seen in the fossils there preserved, on its history since the days of Spanish exploration, on the prehistoric and present Amerind inhabitants, and on the plants, reptiles, birds,

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California Centennial. A vigorous grower. The most brilliant, glowing, deep, crimson rose to be found anywhere. Velvety petals are amazingly heavy—will not fade or turn blue.

Tallyho. "All America Rose Selection for 1949". An exceptionally large, lovely pink rose of unusual substance. Perfectly hardy in any section of country.

Sleigh Bells. This charming rose is huge with heavy substance petals of sparkling white—very long stemmed and intensely fragrant. Sturdy plants—glossy, disease-resistant foliage.

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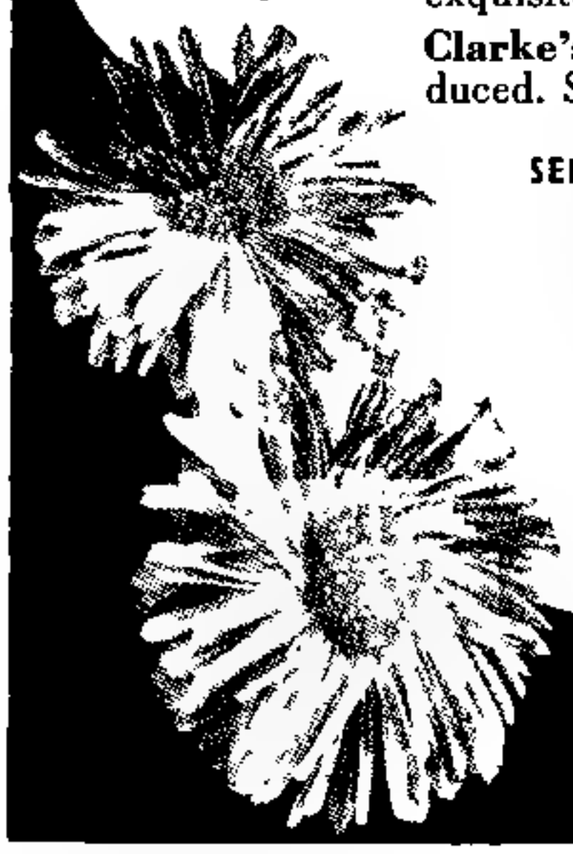

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Wayside Gardens

and mammals living there now, and the remarkable effect that the rigorous environment has upon them. Thirty-four superb photographs and two maps illustrate the well-written text.

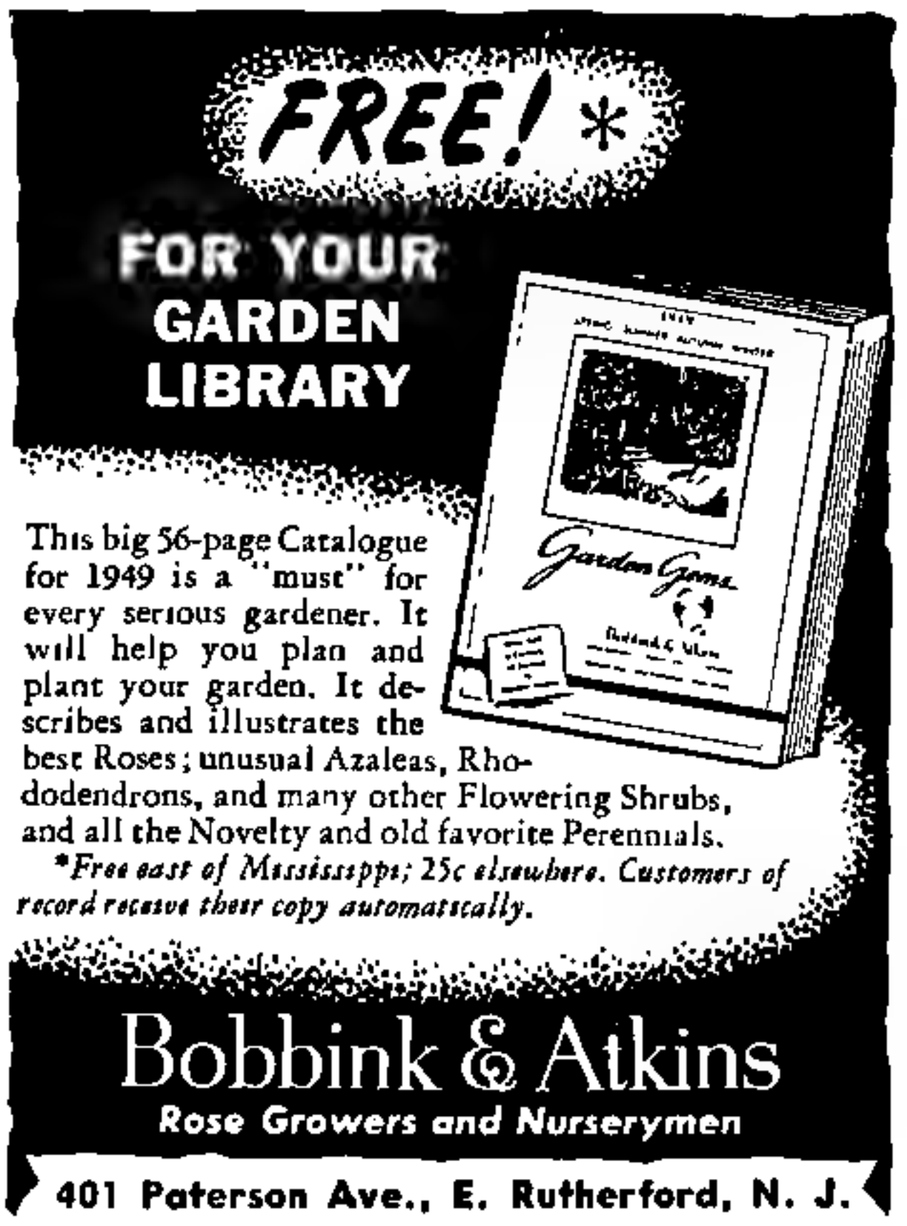
H. N. MOLDENKE.

To Attain Shapelier Plants

PRUNING IS SIMPLE. John & Carol Grant 59 pages, illustrated, indexed. Frank McCaffrey, Seattle, 1948. $2.50.

The title of this book is deceptive, for pruning is not simple. The rules which govern it, however, can be reduced to simple terms, and the authors have performed a service in doing so. It outlines reasons for pruning and best methods: which plants should be pruned in spring, which in fall or winter, and why. Comprehension of these reasons should stay the shears of misguided enthusiasts and result in the kind of pruning which assists plants to attain maximum usefulness and beauty. The diagrams with which the book is illustrated are valuable.

DEETTE B. JACOBS,
Morristown, N. J.



Everyone's Gallery and Concert Hall

DAYS WITHOUT TIME: Adventures of a Naturalist. By Edwin Way Teale. 283 pages, illustrated with 144 photographs by the author. Dodd-Mead, New York, 1948. $6.

Mr. Teale's latest book owes its title to the belief that one way to escape the tyranny of time is to absorb oneself in the study of nature's endless variety. And so we are taken in the course of nearly thirty chapters on a series of carefree rambles during which the living things observed and described range "from floral traps that are a feature of almost every roadside to white owls from the Arctic tundras." A delightfully easy style keeps the reader continuously interested in the flow of fact that comes from a well-filled reservoir of first-hand knowledge. But in addition to being a distinguished naturalist, Mr. Teale is a remarkably fine photographer. Text and illustrations combine to make the book one that ought to inspire many people to drop at least some of their more trivial amusements to sample the pleasures that love of nature can provide. In Mr. Teale's own words: "The out-of-doors is—as it always has been—everybody's art gallery, everybody's concert hall, everybody's library of poetry written in a universal language. The beauty of nature is every generation's gift. It is free for the taking, around us always. And each man, according to his character, realizes its possibilities."

EDITH BRODNEY,
P. S. 68, Bronx

Coffee Lore and Fact

THE ROMANCE OF COFFEE. William H. Ukers. 280 pages, illustrated, indexed. The Tea and Coffee Trade Journal, New York, 1948. $5.

By divulging the discovery of coffee and its initial use as a beverage in Arabia, then recounting the subsequent trials and tribulations of its spread over the earth's surface, Mr. Ukers' book furnishes a well illustrated background to the beverage and properly orients coffee in the order of other great historical developments.

While the geographic approach to the historical chapters lends a certain orderliness of presentation, yet the resulting impression is somewhat confusing to the

reader and the facts are less impressive than if they had been composed into a close-knit chronological narrative. Nevertheless, the amount of historical information produced is a credit to the scholarly research of the author.

The romantic angle definitely flattens out with the beginning of "How coffee grows and how green coffee is marketed." Simple direct text-book statements take it from here and carry on through a prosaic exposition of the roasting process and a statistical analysis of the coffee trade (again geographically treated). It is to be regretted that the author did not permit the aura of romance that is promised in the title to illumine more of the book.

WILLARD M. PORTERFIELD,
Washington, D. C.

Notes, News, and Comment

Zeller Herbarium. The fungus herbarium of Dr. S. M. Zeller, late professor at Oregon State College, was received by the New York Botanical Garden in April. Consisting of dried and preserved material and microscopic preparations totaling more than 3,500 specimens, chiefly of Gasteromycetes, the collection is especially rich in subterranean species (false truffles), in the knowledge of which Dr. Zeller was pre-eminent. During the autumn of 1948 Dr. & Mrs. Zeller were guests of the Garden for several months, while Dr. Zeller, as the recipient of a fellowship, worked on the Gasteromycetes for *North American Flora.* At the time of his death in Corvallis Nov. 4, 1948, the manuscript was nearly completed, and it will be published as soon as possible.

Staff Changes. Dr. E. E. Naylor, who began a six months' leave of absence from the Garden in October, has submitted his resignation, effective April 1. He is now in California.

To succeed him in taking charge of the Garden's educational work, G. L. Wittrock has been appointed Assistant Curator of Education.

The new Custodian of the Herbarium, taking the post left vacant by Mr. Wittrock, is Frank C. MacKeever of Norwalk, Conn. Mr. MacKeever received a Bachelor of Science degree from the University of Connecticut in 1925.

Stockholm Secretary. Dr. W. H. Camp has been appointed secretary of committees on the nomenclature of garden plants and also of genetically complicated species for the Botanical Congress in Stockholm July 12 - 20, 1950. Other officers who have been appointed from the Garden were announced in the April Journal.

Tulips. The cover picture on the April issue of *Flower Grower* magazine shows a tulip planting against a background of azaleas in one of the borders at the New York Botanical Garden. The photograph is by David Seabrooks, whose work also appears on the cover of this month's Journal.

Lectures. Dr. William J. Robbins addressed the Twentieth Century Club in Pittsburgh on "The Challenge of Science" March 14. The Biology Club

SEEDS OF RARE PLANTS

THE PIONEER SEED CO., Dimondale 9, Mich., U.S.A., wish to obtain seed of any rare plants, either by exchange or purchase. Write for a copy of their monthly catalog of Rare Flower Seeds.

of Drew University, Madison, N. J., heard Dr. Donald P. Rogers March 2 on "Hawaiian Botany." Dr. H. N. Moldenke talked on "Plants of the Bible" at the Methodist Church at Irvington, N. J., April 10. On April 14 Dr. W. H. Camp addressed the staff of the Research Center of the Goodyear Tire and Rubber Company near Cleveland on the importance of botanical research to modern industry.

Staff members who have spoken in recent weeks before Garden Club Affiliates are Dr. Camp, "Timberline Trails from Mexico to the Yukon" April 18, Montclair, and "Origins of our Garden Flowers" April 26, Working Gardeners of Bronxville; E. J. Alexander, "Wild Flowers for our Gardens" April 25, Mamaroneck Garden Club; G. L. Wittrock, "Plants Used by the American Indians" April 20, Hastings-on-Hudson; Elizabeth C. Hall, "The Literature of Gardening" April 25, Garden Department of Bronxville Women's Club, and Dr. P. P. Pirone, "Diseases and Insect Pests of Berried Shrubs" April 20, Short Hills Garden Club.

Television. E. J. Alexander appeared on the television program of the Dumont station, WABD, channel 5, on the afternoon of March 30, in an interview on cacti as house plants. On April 27 Dr. P. P. Pirone was guest speaker on the same program, talking on plant pests and diseases.

Insect Lecture. Brayton Eddy, Curator of Insects and Reptiles at the New York Zoological Society, lectured at the Garden April 2 on "Insects to Look for in Your Garden This Year," substituting for Dr. P. P. Pirone, who was prevented by illness from giving his scheduled talk in the Saturday series. The illustrations used were the Garden's set of kodachromes made from the original watercolors by Eva Melady, which were reproduced in "The Gardener's Bug Book" by Cynthia Westcott, published in 1946.

Visitors. Dr. H. J. Lam of the Rijksherbarium at Leiden, The Netherlands, spent the week-end of March 28 with Drs. William J. Robbins, H. W. Rickett, and W. H. Camp at the New York Botanical Garden.

Dr Raymond L. Taylor, Administrative Secretary of the A.A.A.S., Washington, D. C., visited Dr. Robbins March 8.

Mrs. Lazella Schwarten, Librarian at the Arnold Arboretum, came to the Garden in April to inspect plans for the library in the Garden's proposed new building.

Among other springtime visitors have been George Black of Belem, Brazil; Dr. Paul Burkholder of the Osborn Botanical Laboratory at Yale; Dr. Geneva Sayre of Russell Sage College; Robert B. Fisher of Mt. Vernon, Va.; Louis H. Jordal of the University of Michigan, and Mr. and Mrs. Jack Whitehead of Berkeley, Calif.

Helen Noyes Webster. News of the death of Mrs. Hollis Webster in Boston on March 21 reached the New York Botanical Garden and other organizations with which she had been associated the following day. She had rallied from an operation, but succumbed within ten day to coronary thrombosis.

Considered America's leading authority on the culture of herbs, Mrs. Webster, whose home was in Lexington, Mass., was one of the founders of the Herb Society of America 15 years ago, and its president in 1947-48. She was the author of "Herbs, How to Grow Them and How to Use Them," first published in 1933 by the Massachusetts Horticultural Society, with which she was also closely associated, and later issued in a revised edition by Hale, Cushman & Flint. The fifth edition of the book is now being distributed by Charles T. Branford of Boston, successor to the Hale company.

During the series of programs on "Gardens and Plant Lore of Medieval Europe" given jointly by the Metropolitan Museum of Art and the New York Botanical Garden at The Cloisters and the Garden in the spring of 1941, Mrs. Webster spoke on "Medicinal Herbs and Medieval Herbals" and distributed an annotated list of historic books on this subject. Her latest visit to the Botanical Garden was on June 22, 1948, when the American Herb Society had part of its annual meeting there. She wrote extensively on herbs for horticultural magazines and in February 1947 she contributed a review to the Journal of the New York Botanical Garden.

Elected. Dr. H. N. Moldenke has been elected a corresponding member of the Sociedad Cubana de Botánica in Havana.

THE NEW YORK BOTANICAL GARDEN

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PUBLICATIONS OF THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

An Illustrated Flora of the Northern United States and Canada, by Nathaniel Lord Britton and Addison Brown. Three volumes, giving descriptions and illustrations of 4,666 species. Second edition, reprinted. $15.

Flora of the Prairies and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex by K. K. Mackenzie. From Vol. 19, Part 1, of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marion A. & G. L. Wittrock in the Journal for March 1942. 15 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal, 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 15 cents.

The Flora of the Unicorn Tapestries by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second edition 1947. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at the New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts by E. J. Alexander. 64 pages, indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. 50 cents.

Review of Juniperus chinensis, et al by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.

Periodicals

Journal of The New York Botanical Garden, monthly, containing news, book reviews, and non-technical articles on botany, exploration, and horticulture. $1.50 a year; single copies 15 cents. Free to members of the Garden. Now in its 50th volume.

The Garden, a quarterly, designed to stimulate the laymen's interest in the world of plants and the science of plant life through articles written in popular vein. $2 a year in the United States; all other countries, $2.50. Published by the Garden's Manhattan office at 801 Madison Avenue, New York 21, N. Y. Now in its first volume.

Addisonia, devoted exclusively to colored plates accompanied by popular descriptions of flowering plants; eight plates in each number, thirty-two in each volume. Now in its twenty-second volume. Published irregularly. Subscription price, $10 a volume. Not offered in exchange. Free to members of the Garden.

Mycologia, bimonthly, illustrated in color and otherwise; devoted to fungi, including lichens, containing technical articles and news and notes of general interest. $7 a year; single copies $1.50 each. Now in its forty-first volume. Twenty-four Year Index volume $3.

Brittonia. A series of botanical papers published in co-operation with the American Society of Plant Taxonomists. Subscription price of volumes 1 through 5, $5 a volume ($4 to members of the Society). Now in its seventh volume. Price, $7.50 ($5 to members of the Society).

North American Flora. Descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 97 parts now issued. Not offered in exchange. Prices of the separate parts on request.

Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

Memoirs of The New York Botanical Garden. A collection of scientific papers, 1900-1927. Contents and prices on request.

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

JUNE

1949

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NTS $1.50 A YEAR

TABEBUIA ARGENTEA

NEW OFFICERS FOR THE GARDEN

CHARLES B. Harding, who has been one of the two vice-presidents of the New York Botanical Garden since late in 1947, was elected President at the annual meeting of the Corporation on May 26.

This was the Garden's first annual meeting to take place in the spring. With it were combined dedication of the Robert H. Montgomery Conifer Collection and the first official run of the tractor train, the *Floral Flyer*. All members of the Garden were invited to the meeting, which took place in the lecture hall. An address by Henry Teuscher, Curator of the Montreal Botanical Garden, on the new conifer collection culminated with the formal christening of the dwarf blue spruce described in this Journal last month. Mr. Teuscher presented the Garden with a young plant which he had raised at Montreal from a cutting from this spruce, taken when it was still on the Montgomery estate at Cos Cob, Conn.

Joseph R. Swan, who has been the Garden's president since 1938, was given the newly created post of Chairman of the Board at the meeting of May 26.

To succeed Mr. Harding in the vice-presidency, Frederick S. Moseley, Jr., was stepped up from the Board of Managers. The other vice-president is John L. Merrill, who, with other officers, was re-elected.

Other events of the meeting will be announced in the forthcoming Journal.

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CAROL H. WOODWARD, Editor

VOL. 50 JUNE 1949 NO. 594

Tabebuia Trees for Warm Regions

A Group of Showy-Flowered American Ornamentals Described

By Edwin A. Menninger

Stuart, Florida

THE most satisfactory flowering trees for parkway and yard planting in southern Florida belong to the genus *Tabebuia*. This Brazilian name applies to about ninety species of broad-leaved, mostly evergreen trees from the West Indies and Central and South America, some of which formerly were included in *Tecoma*.

Almost without exception they are showy-flowered and precocious, with blossoms white, pink, lavender, purple, red or yellow, frequently in great profusion. F. C. Hoehne, director of the botanic garden at Saõ Paulo, Brazil, in his book "City Planting of Trees,"[1]* sums up the utility of the *Tabebuia* group when he says: "To name the species most worth cultivating is easier than to exclude those not worth while," and then he suggests ten outstanding kinds for street planting in Brazil, only one of which has yet come to us.

Of the half dozen species being grown generally in Florida now, commonest by far is the Paraguayan silver-trumpet tree (*T. argentea*) which owes its name to the silver-gray cast of its evergreen leaves. It bears trusses of golden-yellow flowers in April.

There has been so much confusion, even among botanists, in the names of other species introduced by the United States Department of Agriculture and similar agencies and now being grown in Florida, that years may elapse before they can be separated. Two different trees have been introduced under the name *T. pentaphylla,* though probably the big-leaved national tree of Salvador alone is properly so called. Standley[2] says that in Central America this tree "is densely covered with flower panicles so as to form a giant bouquet, . . . an unsurpassed display of color varying from nearly white to deep rose; in their tints the flowers recall the

*A list of references on *Tabebuia* will be found at the end of the article.

Japanese cherries and are equally beautiful." There have been at least two entirely different trees introduced into Florida under the name *T. pallida,* one deciduous and the other evergreen, and there are many specimens of both trees in common cultivation. L. H. Bailey's "Hortus Second" only adds to the confusion by making *T. pentaphylla* and *T. pallida* synonymous.

The only other species now planted in Florida (and these on a smaller scale because more recently introduced and not so well known) are the deciduous *T. palmeri* from Mexico, *T. guayacan* from Panama, *T. rosea* from Central America, *T. donnell-smithi* from Mexico (now properly known as *Cybistax donnell-smithi*), and *T. serratifolia* from Trinidad, which is probably the showiest-flowered of them all.

Here are seven reasons why these *Tabebuia* trees are termed most satisfactory in Florida:

(1) They produce their floral display in winter or early spring when the tourist population is at its height. *T. palmeri* begins blooming in December and the other species keep up the procession of beauty through May. Although the flowering periods are usually two to three weeks, the evergreen *T. pallida* blooms almost continuously for eight or ten weeks—March to May—and repeats with a shorter period later in the year. Several species flower when only three or four feet high. Most species of *Tabebuia* are evergreen but even those that drop their leaves do so when flowers are ready to bedeck the limbs, so that the trees are almost never bare, even in winter.

(2) With the exception of *T. donnell-smithi,* all the species being grown in Florida are small enough to find place in the average yard and not to outgrow their location.

(3) No diseases or pests of any kind appear to attack the *Tabebuia* now in cultivation.

(4) The glossy-leaved *Tabebuia* are sufficiently salt-resistant to permit their use in landscaping of waterfront homes. A considerable number of the trees are in successful cultivation around homes in Palm Beach where

TWO TABEBUIAS OF UNCERTAIN IDENTITY

(On the opposite page)

Above is the evergreen form of the plant that is known as *Tabebuia pallida.* Its profuse blooming over a ten-week period between March and May each year makes it ideal for Florida yards. The blossoms are shell-pink, appearing almost white at a distance. Native in the West Indies, it is called "swamp oak" in Cuba. It is undamaged by inundation. (Tropical photo, Stuart, Fla.)

Below is the earliest-blooming of all the tabebuias. Brought from Venezuela by Dr. David Fairchild for the Fairchild Tropical Garden at Coconut Grove, it flowers, while leafless, from Dec. 1 to Feb. 1. The petals are a rosy pink, the throat yellow, and in general the tree resembles *T. palmeri,* except that in Florida it flowers two months earlier. (Coutant photo, Stuart, Fla.)

TWO TABEBUIAS OF UNCERTAIN IDENTITY

(*See the opposite page*)

salt spray from the trade winds over the Gulf Stream is a considerable factor.

(5) Some species of *Tabebuia* withstand inundation for extended periods without damage. At Fort Lauderdale, Fla., in June 1947, specimens of *T. rosea* and *T. pentaphylla* were covered by flood waters for six weeks without injury. *T. aquatilis* grows naturally in inundated savannahs and reaches a height of 100 feet or more.

(6) Other species are particularly suited to dry regions. *T. leucoxylon* thrives in Trinidad in "very dry and exposed situations,"[3] and *T. serratifolia* is a very slow-growing Trinidad forest tree, found only on dry hillsides, with gray wood so hard that it weighs 70 pounds per cubic foot. (Compare balsa 7 pounds, cork 13, oak 40, mahogany 45, ebony 73.)

(7) Some species of *Tabebuia* are sufficiently hardy to thrive in central and north Florida. This has long been known to be true of *T. argentea.* In Orlando, Fla., is a mature specimen of *T. obscura* which thrives despite occasional low temperatures of 26° F. It was brought back from Brazil by Mulford Foster, distinguished authority on bromeliads, and is growing in his dooryard. The tree is deciduous, has never set any seed, and has resisted all efforts to propagate it by any other means. Because of its extravagant flowering in April, Mr. Foster looks with jaundiced eye at the specific name "obscura." There are a few trees of other species of *Tabebuia* in cultivation experimentally in other parts of northern Florida and preliminary conclusions are that the deciduous types that grow at high elevations in their native habitats (and therefore are in some measure inured to cold spells during their dormant periods) will probably survive the winter temperatures of all parts of Florida and areas with similar climate.

PURPLE AND YELLOW FLOWERS FOR A FLORIDA SPRING

(*On the opposite page*)

Above: Introduced by the U. S. Department of Agriculture, *Tabebuia palmeri* was brought in from Central America. This tree came into bloom on March 18 this year and continued for three weeks. The bright flowers of lilac-purple (031/2 on the R.H.S. chart) have a yellow throat (aureolin 3/1) when fresh, but this fades and disappears entirely after the first day, being replaced by the dominant color of the rest of the flower. The intensity of this color gradually fades. (Coutant photo, Stuart, Fla.)

Below: Most common among the tabebuias now in Florida is the silver-trumpet tree, *T. argentea,* from Paraguay. Although it is ordinarily evergreen, displaying yellow flowers among silver-gray-green leaves, occasionally there are so many flowers that they seem to brush away the leaves to take the stage for themselves. New leaves then appear before the golden show is over. The bark of this species is soft, corky, and whitish. (Nixon Smiley photo, Miami Herald)

Because some of the *Tabebuia* provide lumber of exceptional beauty of grain and color, and because others furnish timber of great durability, many of the natural stands of the trees in Central America and elsewhere have been slaughtered. In Salvador at least one species has been saved from extinction only by the organization of the Society for the Beautification of the Highways of Salvador, which has grown many thousands of seedlings and planted them along the roadsides of the nation.

Timber experts, not interested in the ornamental quality of the trees, classify *Tabebuia* on an economic rather than a botanical basis, and recognize three degrees of hardness and durability:

(a) The White Cedar group, in which the wood resembles birch. (*T. insignis, T. aquatalis.*)

(b) The Roble group, with brownish, medium hard wood resembling plain sawed oak, not very durable in contact with the ground. (*T. pentaphylla.*)

(c) The Lapacho group, embodying a large number of species with olive-brown, more or less oily, very dense timbers containing an abundance of sulphur-like deposits (lapachol compound). The wood is highly resistant to decay. Standley[2] records of *T. guayacan*: "Some of the beams of the cathedral of Old Panama are said to have been of this wood and to have remained sound although exposed to the weather 250 years." (Other important members of this group are *T. ipe, T. palmeri, T. serratifolia, T. barbata, T. lapacho.*)

Although it is beyond the scope of this paper to refer to all known species of *Tabebuia,* attention can be drawn to those offering most promise for ornamental planting in the warmer parts of the United States. The Brazilian species selected by Hoehne[1] for street planting are:

T. alba—Specific name is from the white fuzzy leaves. Yellow flowers.
T. caraiba—"A very beautiful tree" with large yellow flowers.
T. chrysothricha—"A beautiful tree of good form and abundant yellow flowers."
T. eximia—Dark red flowers.
T. impetiginosa—Large tree of rapid growth. Red flowers.
T. ipe—Red, reddish or purple flowers, "precocious and ornamental when in bloom."
T. lapacho—Pink-flowered. "Of most beautiful appearance."

On the Cover

This specimen of *Tabebuia argentea* started blooming in the author's yard this year on April 15 and continued to unfold its flowers and carpet the ground below with yellow blossoms for about three weeks. As flowering continued, new leaves began to appear at the top of the tree. Meanwhile, one upright branch which has recently arisen from the leaning trunk is in full foliage with no flowers. This tree has a tendency to lie down and in its juvenile stages resembles a trailing vine more than it does a tree. This explains the leaning posture, which is characteristic of this species. (Tropical photo, Stuart, Fla.)

A MONTH OF BRIGHT PINK BLOOM AMID GREEN LEAVES

This specimen of *Tabebuia rosea* from South America flowered this year without interruption from Feb. 15 to Mar. 15 in Stuart, Florida. When fresh the flowers are China rose (024/2 by the Royal Horticultural Society's chart); they fade to crimson (22/3). The tree has a tendency toward fastigate growth. (Ruhnke photo, Stuart, Fla.)

T. leucoxylon—"Wonderful in possessing white flowers in great number." (The flowers of the West Indian species are sometimes rosy pink, and in Trinidad the color is described as "pale mauve with yellow throat."[3])

T. ochracea—"Very elegant"; large yellow flowers.

T. umbellata—Yellow flowers, medium height, slow growth, "but easiest of all to transplant."

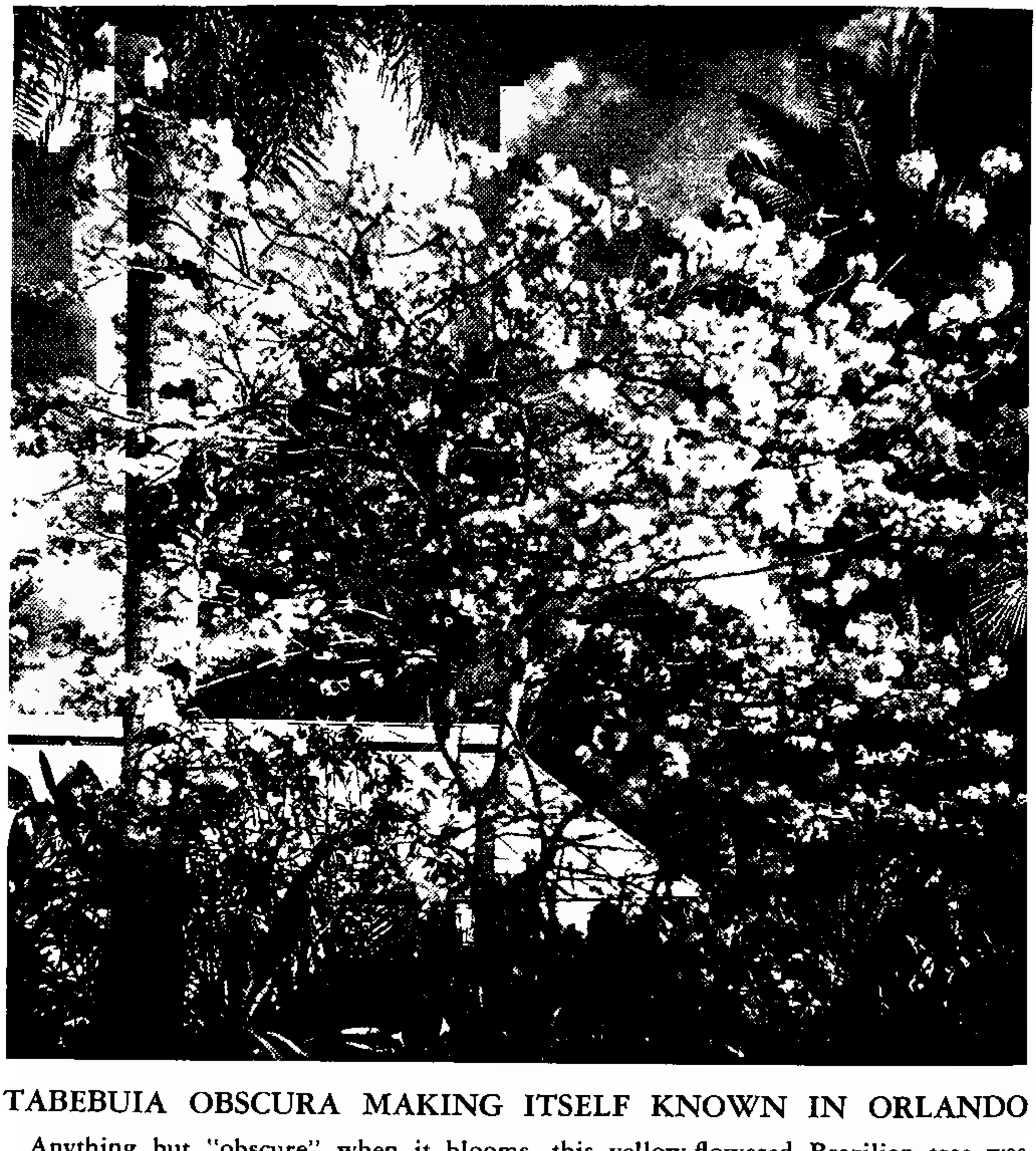
Other Brazilian species already being grown in Florida as ornamentals include:

T. obscura—Yellow flowers. Blooms without leaves.
T. chrysea—Yellow flowers.

Central American and Mexican species now in limited cultivation in Florida include:

T. chrysantha—The plant originally described under this name has yellow flowers, but there is also a dark-purple-flowered type from Salvador.
T. guayacan—Standley says "handsome" yellow flowers. Blooms without leaves.
T. rosea—Pink flowers, fastigiate growth. Blooms with leaves.
T. palmeri—Pink or lavender flowers. Blooms with or without leaves.
T. donnell-smithi—Golden yellow flowers. Blooms without leaves.

There are a number of Central American species that are described in glowing terms but which have never been introduced into the United States. These include *T. spectabilis* of Colombia* which is described by Macmillan[5], *T. aesculifolia* described by Rehder as having "orange red flowers with yellow spots on three lower lobes"[6] (this may be confused with *Godmania*



TABEBUIA OBSCURA MAKING ITSELF KNOWN IN ORLANDO

Anything but "obscure" when it blooms, this yellow-flowered Brazilian tree was brought to Orlando, Fla., by Mulford and Racine Foster, authors of "Brazil — Orchid of the Tropics," when they returned from a bromeliad-collecting expedition to the Amazon country. Growing in their home grounds, it refuses to set seed or grow from layers or cuttings. (Orlando Sentinel staff photograph.)

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* Since this article was written, *Tabebuia spectabilis* has been introduced into the United States by the Fairchild Tropical Garden, Coconut Grove, Fla., and small plants distributed to members in March 1949.

aesculifolia, a related tree with greenish-yellow flowers) ; and *T. stenocalyx* with large white flowers—one of the few species of *Tabebuia* with simple leaves ; most species have 3, 5 or 7 leaflets.

West Indian species which have already been brought into cultivation include :

T. pallida—Flowers rose to white or pink. The deciduous tree bearing this name in Florida has linear, obcordate leaves and rosy purple flowers, and blooms as a mass while limbs are bare, once a year. The evergreen tree under this name has ovate-lanceolate leaves, produces dense racemes of shell-pink flowers among the leaves twice a year, and tends toward umbrageous growth.

T. haemantha—Cuban tree with red or crimson flowers.

T. glomerata—Puerto Rican tree with clustered bright yellow flowers.

There are at least twelve other species in the West Indies. Britton [7] describes two red-flowered species in Puerto Rico with simple leaves, *T. rigida* and *T schumannianum.* The Harvard Botanical Garden in Cuba has found special merit in three other West Indian species, *T. heterophylla* and *T. lepidota,* both with pale pink blossoms, and *T. sauvallei,* a shrubby, patio type with tiny mauve flowers. [8]

Because *Tabebuia* trees seed sparingly or not at all in Florida and because the papery seeds must be caught in bags before the pods fly open, propagation of some species is slow. Some, however, can be grown from cuttings. The number of trees being planted in Florida is rapidly increasing as public interest in their winter-blooming quality mounts.

LIST OF REFERENCES ON TABEBUIA

(1) Hoehne: "Arborizacão Urbana."
(2) Standley: "Flora of the Panama Canal Zone."
(3) Williams: "Useful and Ornamental Plants of Trinidad and Tobago."
(4) Record & Hess: "Timbers of the New World."
(5) Macmillan: "Tropical Planting and Gardening."
(6) Bailey: "Cyclopedia of Horticulture."
(7) Britton & Wilson: "Flora of Puerto Rico and the Virgin Islands."
(8) Sturrock & Menninger: "Shade and Ornamental Trees for South Florida and Cuba."

Tank Gardening

By F. Cleveland Morgan
Montreal, Canada

SINK gardens long have been a hobby with many rock garden enthusiasts, so there is nothing very radical about a tank garden, which is merely an enlarged and glorified sink.* The word "tank" is not meant to imply hydroponics, or water culture, or even aquatic gardening, but

* A sink garden is often made of an old pig trough or its equivalent in a porous stone, and is used to confine "miffy" plants in a specific soil mixture.

is instead a concrete or stone structure in which a different type of soil can be used for plants with individual requirements. The possible size of a tank greatly increases its usefulness over that of a sink, because it enables the gardener to try soil experiments on a much larger scale and to grow colonies of plants instead of single specimens for trial under a particular set of circumstances. But before elaborating on this theme, I had better describe in detail my tank gardens and how they are built.

When I first started experimenting, I built the tanks with 6-inch reinforced concrete walls with sloping bottoms for drainage and a valve at the lowest end to let out surplus water. The length of a tank is of no importance, though I decided to limit mine to 12 feet. The width should be governed by the length of one's reach, enabling one to weed from either side with comfort, so I decided on 5 feet for the width. Height is also a matter of individual preference and can be made to fit one's stature; too low a tank is apt to give one a backache and so my choice would be 3 feet. This height not only avoids bending but gives great depth of soil, plenty of drainage, and above all enables one to see the plants at close range. Many of them are so minute (perhaps only an inch or so high) that in the garden bed they cannot be examined in comfort.

These tanks are first filled with stones the size of a fist to the depth of about a foot. Then a layer of smaller stones — say of 2 inches diameter — is put in. Gradually the material gets smaller until the uppermost foot consists of coarse sand, fine gravel, and good loam. This top should be full to overflowing and a gentle hose used to induce settling. It is surprising how far the loose bedding will pack down! Once the soil is settled, a bit of landscaping can be done with suitable rocks over the surface, both to break the monotony and to supply the necessary crevices for various types of plants which call for them. The soil, of course, can be varied in each tank, one made up of limy rubble, one of neutral sandy soil, and one of extremely acid peat. In the latter, I use half rotten cedar logs which are in a friable enough stage to decompose readily. These are buried just below the surface while mossy roots, among which plants can be tucked, are allowed to project above the soil.

My first three tanks were built in concrete, but my second try was with fieldstone set in cement, but with no cement bottoms, and with no special drainage contraptions, such as the concrete tanks have. These have worked equally well and are certainly better looking. The tanks, by the way, are all built side by side like hotbeds with a 30-inch passage between.

As our summer sun can be exceedingly hot, I have provided removable screens above the beds. To make these I set upright iron pipes about 7 feet high into the tank walls, three on each side. These pipes carry flat flanges to which stout framing is attached, forming a skeleton canopy

with sliding grooves. Into these grooves I insert sections of slatted wood for the summer months. These are readily removed once the sun has lost its power in the autumn.

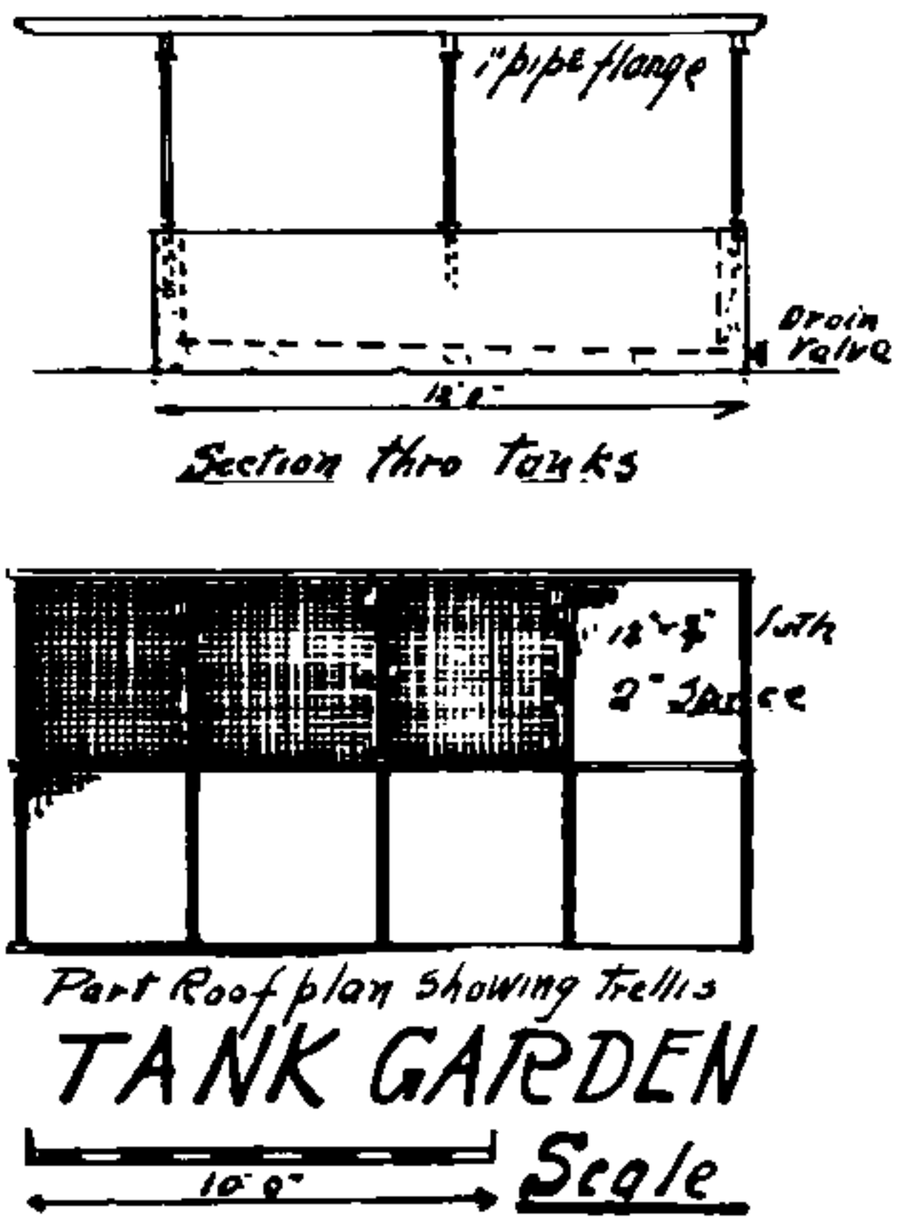
As an additional convenience I have run water pipes to these tanks, setting three "London fog" sprays on the canopy above each tank. These sprays, which are made by fire extinguisher companies, give off under pressure a fine mist which thoroughly soaks the soil without damaging the plants. Of course, I never water in the heat of the day, and a good soaking will generally last a week or more.

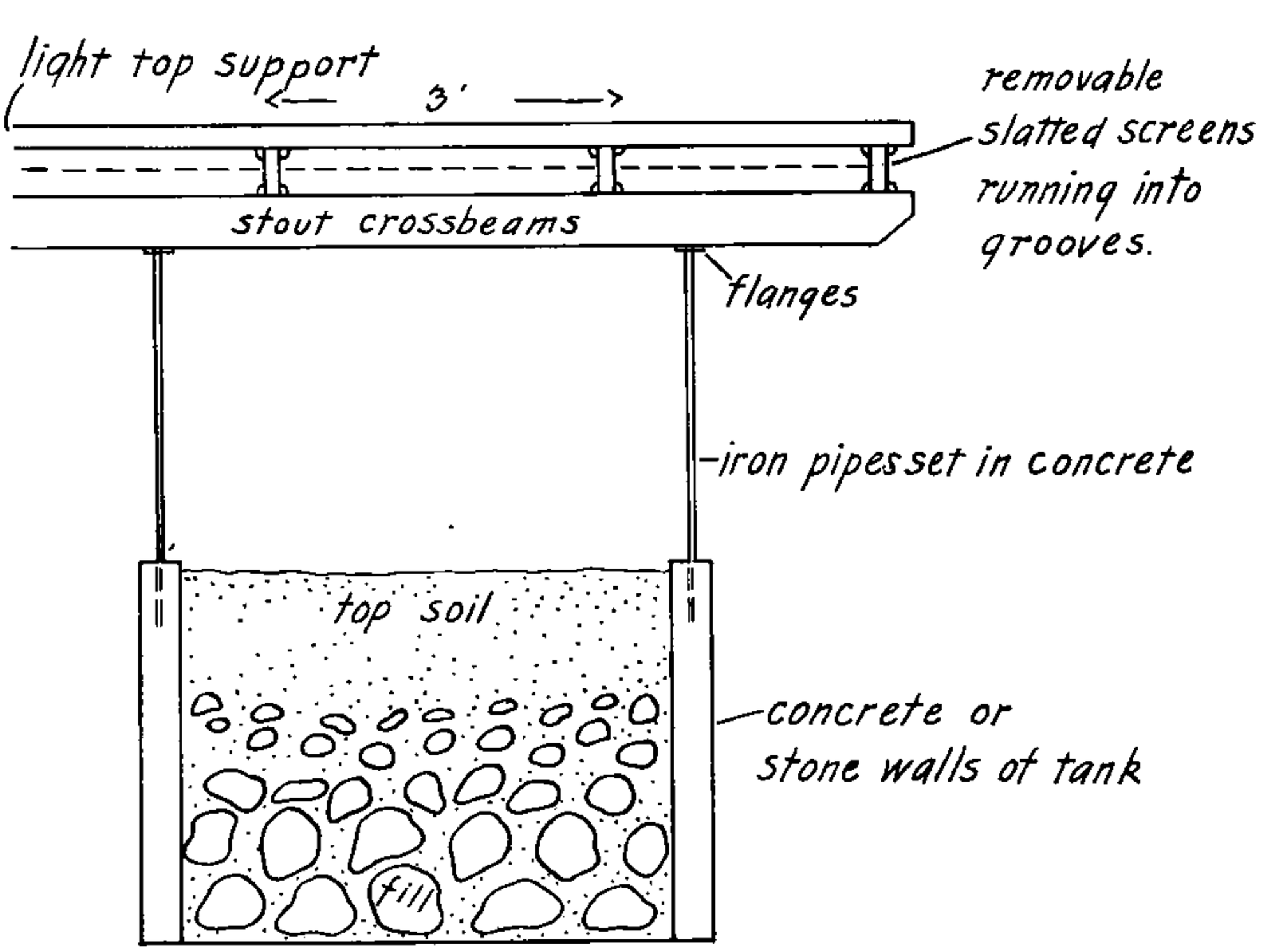
For certain plants I have found hard coal ashes, well leached and sifted, a splendid material to mix with the top layer. They certainly induce good root growth, and seedlings thrive in the mixture. This is particularly true of woody species of *Penstemon*, many of which are difficult in our eastern gardens.

The range of material which can be grown in these tanks is enormous and, while it is advisable to reserve them for the tiniest of plants, an occasional group of larger shrubs — and by these I mean dwarf forms only — adds interest and variety to the scene. Colonies of dwarf narcissi, like *N. minimus or N. cyclamineus,* dwarf fritillarias, cyclamen, such as *C. europaeum* or *C. Neapolitanum,* small calochorti and a host of other bulbs are suitable material. Dwarf willows, genistas, many compact evergreens, the smallest ericas, some of the smaller rhododendrons — these latter for the acid tank only — are suggested. Among flowering plants, consider the Kabschia saxifrages, the tiny pinks, campanulas, alpine poppies, lewisias, and an endless list of other little beauties.

In our climate, where the temperature has been known to drop to 46 below zero, a certain amount of protection is advisable in winter. First

Tank gardens in which the author grows a great variety of plants under different sets of specialized conditions





cross section of tank

I roll over each tank a blanket of glass wool, this being the best type of mulch I have been able to discover. As it is porous it admits air to the plants beneath and does not let them smother. To prevent blowing off I cover this lightly with a coarse chicken wire, but *never* with heavy sticks, as beneath each one there would be a line of dead plants in the springtime. This mulch should be put on rather late in the fall and eased off gradually in the spring to prevent rot and mildew.

Since the stone or concrete sides do not keep out frost, I place stout sticks around the whole group of tanks about a foot away from the walls and stretch chicken wire around these posts. In the intervening spaces and in the paths between the tanks I stuff fallen leaves as a protection.

For either small properties or large, the use of tanks greatly widens the scope of gardening. Much valuable work can be done in them by a keen amateur. Whether he starts with one tank or a dozen, my wager is that the numbers will increase as his collection grows and as he gains experience and confidence.

Birds at the New York Botanical Garden

By William F. Drescher

TO a majority of visitors to the New York Botanical Garden, the "park" is considered either, as its name implies, as a place for the study of botany, or as a place for recreation. Not so, however, to the group which might be termed The Ancient Order of Bird Watchers, composed of ornithologists, pseudo-ornithologists, and a few just plain "list-hunters." To this group the "park" is merely that area comprising the Boulder Bridge and its environs, the Hemlocks, and the banks of the Bronx River as far south as Pelham Parkway. Within this area, where the shrubs and trees offer food and shelter to the birds, it is possible to see many of the migrants as they fly northward in the spring, some on their way to more distant breeding grounds, others stopping here to nest. Again in the fall the returning migrants from the north can be observed as they travel to their winter homes farther south. A number of northern species, such as the junco, the white-breasted nuthatch, a few of the woodpeckers, the white-throated sparrow and others, besides the ducks, call the New York Botanical Garden their winter home. There are, in addition, a number of year round residents in the bird population here.

In former years, before its destruction to make way for a project that was never carried out, the section known as "The Willows" north of Boulder Bridge was an ideal nesting site for summer resident birds, and in winter it afforded excellent coverage for those that failed to return south in the fall. The summer visitors nesting here included the rose-breasted grosbeak, Baltimore oriole, wood thrush, catbird, brown thrasher, purple grackle, and warbling and red-eyed vireos. In winter at various times it sheltered cardinal, brown thrasher, and hermit thrush, one of the latter a part albino (1926).

From 1926 to the present close to 170 species and subspecies of birds have been observed and reported by competent, reliable watchers. Many of the migrants reported pass through year after year; others are erratic in their visits and may skip a number of years. Of some there is but a single record. Occasional visitors are the redpolls, red crossbills (possibly three records), and prothonotary warbler (3 records). The tufted titmouse, previously to its first visit in 1932, seemed to consider the Hudson River an unsurmountable barrier, for it had never been recorded anywhere east of it. Since then it has been seen at the New York Botanical Garden a number of times, and one observer has reported a breeding record for the "park."

Migrants reported on only a single occasion are the northern shrike (also known as the butcher bird because of its habit of impaling its prey on thorns or even barbed wire fences), Arctic three-toed woodpecker (before 1926), red-headed woodpecker, sorra rail, summer tanager, Philadelphia vireo, European widgeon, evening grosbeak, mocking bird, yellow-throated warbler, and the dovekie.* The most unusual visitor, the dovekie, blown inland during a severe November wind storm, dropped exhausted near Twin Lakes and very shortly after was found dead. The late R. S. Williams, a former staff member, made a "skin" of it.

Throughout the winter months owls of various species may be found wintering in the Hemlocks, such as the barred, great horned, longeared, saw-whet and screech owl. The last is a permanent resident here.

During the past autumn and all of this year up to April 30 a feeding station was maintained by the writer in and about the Rock Garden. More than 100 pounds of chick feed and 25 pounds of suet were put out for winter residents, among which were juncos, song sparrows, white throats, fox, house and tree sparrows, pine siskins, white-breasted nuthatches, hairy and downy woodpeckers, bluejays, black-capped chickadees and, last but not least, a male cardinal. In mid-February a flock of twelve robins arrived.

Some of the "list hunters," who generally came along to the feeding station carrying both a camera and a pair of binoculars, seldom brought

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*See the Journal of the New York Botanical Garden for January 1933 for an article "Dovekies in the Bronx" by Helen Lunt.

anything in the way of food, their sole object being to be able to boast of varieties they had seen. On the other hand, many people, most of whom did not know one species from another, added bread, peanuts, and other items to the menu, and enjoyed their reward of watching the birds come to feed.

It is the hope of the writer that some of the readers may become interested in this wonderful hobby of bird watching and join this great fraternity, whose insignia consists of a pair of binoculars or other field glasses and a Peterson's Guide.* The password is "Have you seen anything?" The answer depends on the powers of observation of the person asked — and occasionally on his imagination. No doubt some of the "Brotherhood" may disagree with the list of species recorded here, for other birds have also been talked about by some observers, but they have not been recorded. There is no guesswork here.

* "Field Guide to the Birds" by Roger Tory Peterson. Sponsored by the National Audubon Society and published by Houghton Mifflin Co., Boston.

BIRDS RECORDED AT THE NEW YORK BOTANICAL GARDEN

This list is not given a technical classification but has been divided into groups for the ease of the reader. The asterisks indicate winter residents or visitors.

DIVERS
Pied-billed Grebe

OCEANIC BIRDS
Dovekie

GULLS
Herring Gull

DUCKS AND GEESE
*Hooded Merganser
American Merganser
*Green-winged Teal
*Blue-winged Teal
European Widgeon
*Baldpate Widgeon
*Mallard
*Black Duck
Gadwall
*Wood Duck
Pintail
Greater Scaup
Golden-eye
*Canada Goose

HERONS & BITTERNS
American Bittern
Great Blue Heron
Eastern Green Heron
*Black-crowned Night Heron
American Egret

RAILS
Sorra Rail

SNIPE
Wilson's Snipe
American Woodcock

WATER BIRDS
Spotted Sandpiper
Solitary Sandpiper
Great Yellowlegs
Killdeer

PHEASANTS
*Ring-necked Pheasant

DOVES
Eastern Mourning Dove

HAWKS
Osprey
Northern Red-shouldered Hawk
*Eastern Red tailed Hawk
Broad-winged Hawk
*Sharp-shinned Hawk
*Cooper's Hawk
*Eastern Goshawk
Duck Hawk
*Sparrow Hawk

OWLS
*Barred Owl
*Great Horned Owl
*Long-eared Owl
*Eastern Screech Owl
*Saw-whet Owl

KINGFISHERS & CUCKOOS

*Eastern Belted Kingfisher
Yellow-billed Cuckoo
Black-billed Cuckoo

WOODPECKERS

*Eastern Hairy Woodpecker
*Northern Downy
Arctic Three-toed Woodpecker (before 1926)
Red-headed Woodpecker
Yellow-bellied Sapsucker
Northern Flicker
Pileated Woodpecker

GOAT-SUCKERS

Chimney Swift
Eastern Nighthawk
Eastern Whip-poor-will

HUMMINGBIRDS

Ruby-throated Hummingbird

FLYCATCHERS

Northern Crested Flycatcher
Eastern Kingbird
Least Flycatcher
Yellow-bellied Flycatcher
Olive-sided Flycatcher
Eastern Wood Pewee
Eastern Phoebe

JAYS AND CROWS

*Northern Blue Jay
*Eastern Crow

BLACKBIRDS

Eastern Red-wing
Eastern Cowbird
Baltimore Oriole
Orchard Oriole (immature)
Rusty Blackbird
Bronzed Grackle
Purple Grackle
*Starling

FINCHES

*Eastern Purple Finch
Eastern Evening Grosbeak
*Red Crossbill (rare)
*Common Redpoll (occasional)
*Pine Siskin
*Eastern Goldfinch
Rose-breasted Grosbeak
Eastern Cardinal
Red-eyed Towhee
Indigo Bunting
Summer Tanager
Scarlet Tanager

SPARROWS

Vesper Sparrow
Eastern Savannah Sparrow
*White-throated Sparrow
White-crowned Sparrow
Field Sparrow
Chipping Sparrow
*Fox Sparrow
*Eastern Song Sparrow
Eastern Swamp Sparrow
*Tree Sparrow
*House Sparrow
*Slate-colored Junco

SWALLOWS

Northern Cliff Swallow
Barn Swallow
Bank Swallow
Rough-winged Swallow
Tree Swallow

WAXWINGS

Cedar Waxwing

SHRIKES

Northern Shrike

VIREOS

Philadelphia Vireo
White-eyed Vireo
Red-eyed Vireo
Blue-headed Vireo
Yellow-throated Vireo

WARBLERS

Black and white Warbler
Northern Parula Warbler
Worm-eating Warbler
Prothonotary Warbler
Golden-winged Warbler
Blue-winged Warbler
Brewster's Warbler
Nashville Warbler
Tennessee Warbler
Yellow-throated Warbler (May 1948)
Orange-crowned Warbler
Eastern Yellow Warbler
Cape May Warbler
Myrtle Warbler
Magnolia Warbler
Black-throated Blue Warbler
Black-throated Green Warbler
Bay-breasted Warbler
Chestnut-sided Warbler
Blackburnian Warbler
Black-poll Warbler
Northern Pine Warbler
Northern Prairie Warbler
Yellow Palm Warbler
Northern Yellow-throat
Northern Water-Thrush
Louisiana Water-Thrush
Yellow-breasted Chat
American Redstart
Hooded Warbler
Wilson's Warbler
Canada Warbler

MOCKINGBIRDS

Eastern Mockingbird
Catbird
Brown Thrasher

WRENS

House Wren
Winter Wren

KINGLETS, TITMICE, ETC.

*Tufted Titmouse (rare)
*Black capped Chickadee
*White-breasted Nuthatch
*Red-breasted Nuthatch (occasional)
Eastern Ruby-crowned Kinglet
Eastern Golden-crowned Kinglet
*Brown Creeper
Blue-gray Gnatcatcher

THRUSHES

Gray-cheeked Thrush
Olive-backed Thrush
*Hermit Thrush (occasional)
Wood Thrush
Eastern Veery
Eastern Bluebird
*Eastern Robin (occasional)

NOTICES AND REVIEWS OF RECENT BOOKS

Absorbing Account of Early Days In the Great Southwest

NATURALISTS OF THE FRONTIER. Samuel Wood Geiser. 296 pages, maps, appendices, index of names. Southern Methodist University, Dallas, Texas. Second edition 1948. $5.

Geiser has followed through newspaper clippings, searched diaries and fieldbooks, traced dates from grave books to headstones, visited nearly forgotten towns and great museums to amplify a work first published in book form in 1937. Since its publication the book has served us often and well for questions of a biobibliographical nature. Now a chapter has been added on "Audubon in Texas," and the roster of naturalists and collectors in Texas, 1820-1880 (still labeled "a partial list") has been extended. Too, the format has been enlivened and made aggressive. But even more important is the fact that this best written, most historically useful account of frontier naturalists, is still *the* outstanding book in its field. Try chapter nine on Charles Wright! It is absorbing, sanguine.

"The preparation of the manuscript has been both arduous and meticulous and has necessitated so many revisions that one is impressed with the imperfectness of supposed historical facts," wrote E. O. Essig in the introduction to his "History of Entomology" (1931). Yet in Geiser's book there is, as the Chinese proverb runs, little evidence of the labor done from the tools strewn about. Geiser has kept company with frontier naturalists long enough to know them personally in a cloistered, esoteric way. He lets his readers share this intimate acquaintance by quoting the now pathetic, now triumphant postals sent out from the midst of an expedition, perhaps to tell a fellow naturalist of recent discoveries. These bits often reveal a penetrating wit, and they add much to the narrative value of the story.

JOSEPH EWAN,
Tulane University.

Cultivated Plants in Hawaii

IN GARDENS OF HAWAII. Marie C. Neal. 805 pages, illustrations, illustrated glossary, color keys, index. Bernice P. Bishop Museum, Honolulu, 1948. $10.

This book was originally intended to be a revision of Miss Neal's earlier publication, "In Honolulu Gardens," but so much was added that it has justly been given a new title. In addition to the descriptions and illustrations of the cultivated ornamentals, a number of native plants have been included in this volume. Each plant is described in simple, nontechnical terms and where economic uses (either to the Old Hawaiians or to the modern peoples) are known, these are also given. Of special interest to the amateur is the author's practice of relating legends and folklore connected with many of the plants.

The new volume, which is more than twice the length of the original, is well illustrated with photographs and drawings. In all respects it represents much improvement over the earlier volume, which in itself was very helpful, and is a significant contribution to our knowledge of the cultivated flowers of Hawaii.

RICHARD S. COWAN

Report from Florida

FAIRCHILD TROPICAL GARDEN — The First Ten Years. Lucita H. Wait. 381 pages, illustrated. The Ronald Press Company, New York. 1948. $3.

The Fairchild Tropical Garden is unique among botanical gardens in this country in that it is located in a frost-free strip of land at Coconut Grove, Florida, for the purpose of introducing and adapting tropical plant material to this country.

Mrs. Wait, Editor of the Garden's Bulletin, leads the reader through the ups and downs of the F.T.G.'s development plant by plant during its first decade. Her story, though informally told,

is likewise a history and a report, for it contains a wealth of facts. It "takes stock" so the Board of Managers might plan for the future.

Various chapters are stories (and records) of certain projects within the garden — the Montgomery Museum and Library, the Garden Club of America Amphitheatre, the Semple Vine Collection, and the Bailey Palm Glade.

A tribute to Col. Robert H. Montgomery, the founder, and to Dr. David Fairchild, the book also gives recognition to many other people who helped develop the garden. Quite a few of the "characters" become old friends, and their enthusiasm stimulates the reader's interest in the Fairchild Tropical Garden.

MARY NOBLE,
Home Gardening for the South.

Man's Greatest Problems

MINERAL NUTRITION OF PLANTS AND ANIMALS. Frank A. Gilbert. 131 pages, illustrations, bibliography, index. University of Oklahoma Press, 1948. $2.75.

The author discusses one by one the inorganic elements essential for the life and well-being of plants and animals. There are numerous illustrations showing plants and animals that were grown in environments deficient in certain elements. The emphasis of this little book is upon the fact that normal plants and animals do not grow upon poor (deficient) soils. Since most of the soils of the earth are deficient in one element or another, the problems raised by man's effort to live upon them in ever increasing numbers are the most important ones yet to be solved by modern man.

F. W. KAVANAGH.

Grasses in Pictures Maps, and Text

THE GRASSES OF NORTH CAROLINA. H. L. Blomquist. 276 pages, 298 maps. 249 illustrations. Duke University Press, Durham, N. C. 1949. $7.50.

Botanists and others interested in the native flora will welcome with enthusiasm Dr. H. L. Blomquist's latest work, "The Grasses of North Carolina." With almost as many beautifully executed illustrations as pages (and more distribution maps!), those who wish to identify the grasses of North Carolina and all adjacent states will find this manual to be the most workable yet published. Each of the 225 line-drawing illustrations is composed of from three to a dozen separate sketches of various parts of the species illustrated, all done by the author. In addition, there are 24 large photographs superbly reproduced by fine-screen halftones that contribute a great deal to the introduction and appendix.

For those who wish to identify grasses that lack flowers, especially in lawns and pastures, the author has included as an appendix a key based upon vegetative characters to the common grasses of these habitats.

The 360 species and varieties of grasses upon which this important work is based represent twelve years of taxonomic and distributional work. It is more than a compilation, however, as it presents observations and opinions (without taxonomic revisions) not previously published.

The book is printed on a high quality, coated book stock, sturdily bound in dark green, illuminated board.

HAROLD J. HUMM.

Experimental Forestry

Two publications recently received from the Charles Lathrop Pack Forestry Foundation deal with the demonstration forest at Warrensburg, New York, where for twenty years there has been intensive forest management, and with a study of forest farming and rural employment in two areas in Wisconsin and Arkansas. These two reports, illustrated with charts, maps, and the Pack forest with photographs, each cover around 30 quarto pages.

Correction

The price of the "Countrie Housewife's Garden," a reprint of a 17th century English book, issued last year by Trovillion Private Press at Herrin, Illinois, is $3 instead of $5 for the regular edition. There is a deluxe edition, printed on Rives hand-made paper and bound in decorative cloth, which is available for $6.

BRIEF BOOK NOTES

Especially for Gardeners

SUCCESS WITH LILIES IN THE HOME GARDEN. Romaine B. Ware. 36 pages, lily chart, subject index. Published by author at Canby, Oregon. 1948. $1.

Concentrated, clearly stated instructions in a booklet-size book bound in board covers for permanence.

KNOW YOUR WEEDS. 233 pages, illustrated, indexed. R. A. Power, Viroqua, Wisc. $1.25.

A privately published reprint of a Government publication from the Nebraska Department of Agriculture. Each weed is illustrated. Although the last paragraph states that in a collection of plants the family, genus, species, and variety of each should be stated on its label, there are no botanical names given in this otherwise useful book.

YOUR BOOK OF GARDEN PLANS. Norman A. Morris. 95 pages, illustrated. Murray & Gee, Inc. Culver City, Calif. 1946. $2.50.

A great deal of practical advice for many types of gardens, presented in text and sketches, some of them in cartoon style. Large pages, paper covers.

HOME GARDENER'S PRONOUNCING DICTIONARY. 92 pages, illustrations. Meredith Publishing Co., Des Moines, Iowa. 1948. 75c.

Keys to pronunciation by means of syllables instead of the accepted diacritical marks always make the words seem labored, and one wonders how the original word is spelled, if one looks at only the part in parentheses. However, an alphabetical list such as this can at least serve to provide authority and uniformity for those botanical names and terms which are so much "Greek" (or Latin) to the average gardener.

HOW TO INCREASE PLANTS. Alfred Carl Hottes. 279 pages, illustrated, indexed. A. T. DeLaMare, New York, 1949. $3.

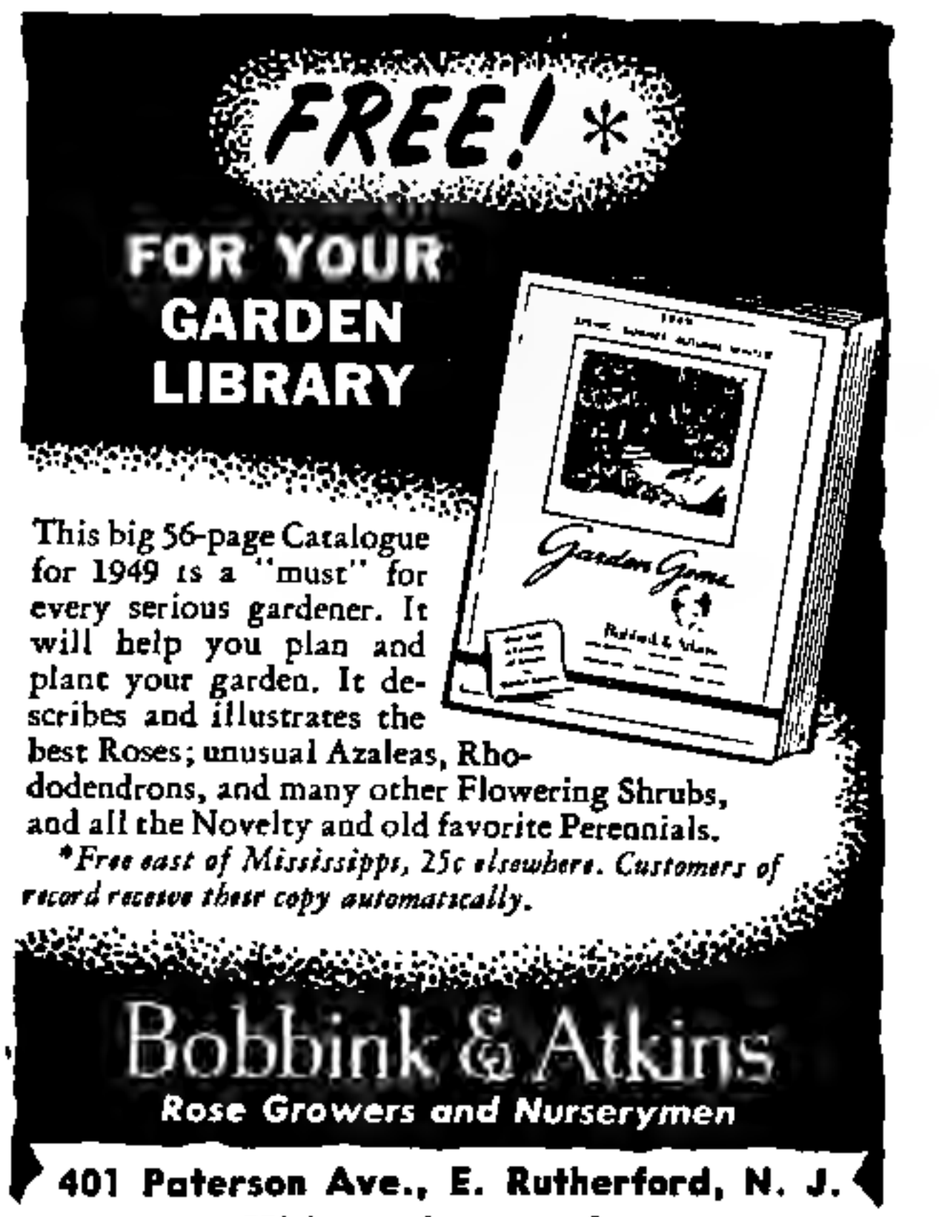
This practical book for the home gardener is done in the author's customary style of questions and answers. In addition there is an alphabetical list with brief directions for propagating each of about 250 plants. Ample indexes and illustrations add to the book's usefulness in a field in which beginning gardeners are forever asking questions.

MY GREEN THUMB GARDEN RECORD AND INVENTORY OF PLANTS, SHRUBS AND TREES. Julia and Kendal Morton. Text House, Coral Gables, Florida, 1948. $3.50.

Gardeners who are seriously concerned about keeping accurate records of their plants from the day that they acquire them will find this record book an indispensable aid. Space is provided for every possible factor in the life and method of cultivation of the plant, including an eight-year record of weather damage. Blank pages have been inserted for additional notes. The firm spiral binding opens easily, and the imitation leather cover is waterproof.

TABLE SETTING FOR EVERYONE. Dorothy Biddle and Dorothea Blom. 127 pages, illustrated, indexed. M. Barrows, New York, 1949. $2.

Small enough for quick, easy reading, the present book, the sixth of these two authors, lays emphasis on the table and the china and silverware required, with only a modest section devoted to the expected subject of flowers for the table. The only illustrations are line drawings of more or less diagrammatic form.



New Editions

FIVE ACRES AND INDEPENDENCE. M. G. Kains. 424 pages, illustrations, index, bibliography. Pocket Books, Inc. New York. 1948. 25c.

This is a Pocket Book, paper-covered edition of a work whose practical nature has sent it through more than a score of printings since it was first published in 1935.

PLANT FAMILIES — HOW TO KNOW THEM. H. E. Jaques. 177 pages, indexed, illustrated. Wm. C. Brown Co., Dubuque, Iowa. 2nd edition. 1948. Spiral binding $1.50, cloth binding $2.50.

The Jaques books have made a place for themselves among beginning students of the natural sciences. The book on Plant Families has now appeared in a new edition in the Pictured-Key Nature Series. It is available both in spiral binding and in cloth, the spiral binding making it possible to lay the pages flat.

VEGETABLE GROWING. James Edward Knott. 314 pages, illustrated, indexed. Lea & Febiger, Philadelphia, 4th edition, 1949. $4.

A beautifully printed revised edition of a well known text and guide for truck farmers.

INTRODUCTION TO APPLIED ENTOMOLOGY. William J. Baerg. 191 pages, illustrated, indexed. Burgess Publishing Co., Minneapolis, 3rd edition, revised, 1949. $3.50.

Many insects which have become familiar to gardeners, either because they are cherished or because of their harmful qualities, are included in this well illustrated, paper-covered, offset-printed volume.

Biographical

MEMOIRS OF A ROSE MAN. J. Horace McFarland. 144 pages, illustrated. Rodale, Emmaus, Pa. 1949. $3.

Half a year after the death of Dr. J. Horace McFarland, beloved rose grower, nurseryman and publisher, of Breeze Hill in Harrisburg, Pa., at the age of 89, a memoir of his life has appeared, taken largely from his own writings and concluded with a brief biography by Robert Rodale. These pages are only a snatch from the thousands that Dr. McFarland must have written during his lifetime. His articles appeared regularly for 25 years in *Flower Grower* magazine, which carried a tribute and biography in its issue of December, 1948. The selections are largely intimate recollections, accompanied by comments on rose personalities and roses.

HUGH DAVIS AND HIS ALABAMA PLANTATION. Weymouth T. Jordan. 177 pages, bibliography, index. University of Alabama Press, 1948. $3.

It is not every southern plantation which kept an accurate record through the years of all of its activities. That is why the Alabama estate of Hugh Davis of a century ago was chosen, in order that a period of great development in the South might be accurately recreated for mid-twentieth century readers. The work has been done by a research professor of history at Alabama Polytechnic Institute, and the book is fully annotated.

Children's Books

BITS THAT GROW BIG. Irma E. Webber. 64 pages, illustrated. Wm. R Scott, New York. 1949. $1.

CHILD'S GARDEN OF FLOWERS. 32 pages, illustrated, and containing 5 packages of flower seeds. Greenberg, New York, 1949. $1.

CHILD'S GARDEN OF VEGETABLES. 32 pages, illustrated, and containing 5 packages of vegetable seeds. Greenberg, New York, 1949. $1.

Three publications came out this spring with packets of seed attached or made a part of the book. The first of these is Irma E. Webber's "Bits that Grow Big," in which a number of simple and interesting experiments are proposed by which the youngest can learn a great deal firsthand by following the directions for growing and propagating plants.

Two others are "Child's Garden of Flowers" and "Child's Garden of Vegetables," each with a suitable text by Robert V. Masters.

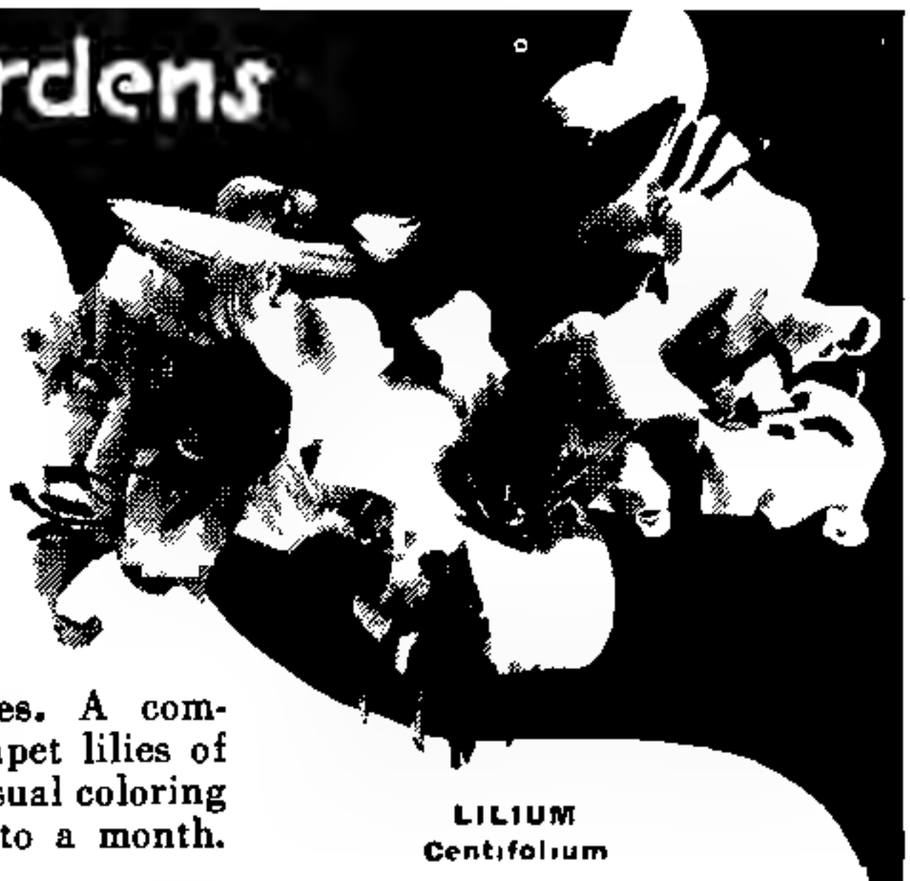
THE PEANUT MAN. Harry J. Albus. 89 pages. Wm. B. Eerdmans, Grand Rapids, Mich. 1948. $1.

A strong religious factor enters into this children's story of the work of the negro scientist, George Washington Carver.

JUNIOR NATURE SERMONS. Jacob J. Sessler. 124 pages. Fleming H. Revell Co. New York, 1948. $1.50.

Birds, insects, beasts, and trees and other aspects of nature are made a part of the Christian religion in this book of "Nature Sermons." Sections concerning plant life are headed by "Autumn Leaves," "Evergreen Trees," and "Trees."

Wayside Gardens



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Wayside Gardens

Notes, News, and Comment

To Philadelphia. Dr. W. H. Camp has resigned from the staff of the New York Botanical Garden as of July 1 to accept the position of Curator of Experimental Botany in the Philadelphia Academy of Sciences. He came to the Garden from Ohio State University in 1936 as Assistant Curator, and was made Associate Curator ten years later. The announcement issued May 19 by the Philadelphia Academy of Sciences reads in part:

"The title Dr. Camp will hold in the Academy is a new one. President Cadwalader and Dr. H. Radclyffe Roberts, Managing Director, point out that Dr. Camp's appointment signifies the Academy's increasing interest in the genetic structure of natural populations as part of their taxonomic research programs.

"Dr. Camp, 45, is a native of Dayton, Ohio, and is a graduate of Otterbein College and Ohio State University, where he took his Ph.D. in 1932.

"During the recent war he was on leave from the Botanical Garden for the purpose of exploration for and production of essential fiber and drug plants. This work took him to Haiti, Honduras, Salvador, Guatemala, Mexico and Ecuador.

"In 1936-37 he made a survey of the state of Oaxaca, Mexico, living with the Zapotec, Mixtec and Mije tribesmen. In Ecuador in 1945 he lived for a time with the head-hunting Jivaros. This exploration was for the purpose of locating wild stands of quinine-producing *Cinchona*

"Dr. Camp has made primary researches in the taxonomy of the rhododendrons, azaleas, cranberries and blueberries with special reference to cultivation, particularly of the blueberries. He has collaborated with the U. S. Department of Agriculture and the North Carolina Experiment Station in their blueberry programs.

"He is President of the American Society of Plant Taxonomists and chairman of its Committee on Nomenclature; also he is Vice-President of the Section on Nomenclature of the International Botanical Congress in Stockholm, 1950, as well as Secretary of the special committees of the Congress on the nomenclature of genetically complicated groups and of cultivated plants."

Gift of Books. From the library of Mrs. Mortimer J. Fox of Peekskill, N. Y., has come a gift of 65 volumes, chiefly horticultural, and many of them rarities. Among them are about a dozen folios on landscape design, including works in French, Spanish, and Italian. There is also a group of English and French horticultural titles from the 17th and 18th centuries and a photostat copy of the "Traité du Jardinage" of Jacques Boyceau of 1638. Mrs. Fox has long been a member of the New York Botanical Garden, of its Advisory Council, and of the Corporation.

North American Flora. Half a century after publication of *North American Flora* was begun at the New York Botanical Garden, Volume 1, Part 1, came off the press as of April 29, 1949. This is a publication of 190 pages devoted to the Myxomycetes. Ceratiomyxales, Liceales, Trichiales, Stemonitales, and Physarales are included. George Willard Martin of the University of Iowa, who did part of the work in New York during the summer of 1947 on a scholarship granted by the New York Botanical Garden, is the author. A bibliography covering 26 pages has been contributed by H. W. Rickett.

Memorial Trees. Two trees were planted as memorials at the New York Botanical Garden April 16. A seven-foot specimen of *Quercus Nuttallii* was set in the oak collection near the main road in the northeast section of the grounds and a flowering dogwood was placed on the terrace near the Conservatory. The oak tree bears a bronze plaque reading: "Planted by his parents for Sid J. Silverberg, born August 4, 1922, lost in the U. S. Air Corps Jan. 15, 1945." The dogwood was provided through the Park Association of New York City by the Misses Louise M. and Augusta F. Mueller for their parents, and is marked, "Planted in loving memory of Charles F. Mueller and Augusta F. Mueller." The Misses Mueller and the parents of Mr. Silverberg are all residents of the Bronx.

Dinner and Lecture. To honor Dr. H. W. Rickett upon his relinquishing of the editorship of the Bulletin of the Torrey Botanical Club, after ten years in that position, the Council of the club gave a dinner for him May 17. The Reverend Charles A. Berger, S.J., head of the

Biology Department at Fordham University, is the new editor, with John A. Small of New Jersey College for Women taking charge of the *Torreya* section of the Bulletin.

The same evening Dr. Rickett was the speaker for the club's meeting at Hunter College, giving a brief narrative of the travels of John Bradbury up the Missouri River in 1810 and 1811. In Liverpool last summer Dr. Rickett was enabled to see some of Bradbury's specimens, which had been lost when he inquired for them there in 1933, and to transcribe some of Bradbury's correspondence from America to his patron in Liverpool. More recently, at the Philadelphia Academy of Sciences, he has had access to the duplicates of these specimens, which are in many instances the types upon which Frederick Pursh based a number of his species.

Tulip Program. More than 125 members of the Garden and other guests attended a program sponsored by the National Tulip Society May 11. After an inspection of the outdoor tulips, the group heard a talk by Margaret Herbst on new tulip varieties, illustrated in kodachrome, and saw the full-color motion picture, "Holland Blooms Again." Tea was served in the Members' Room by the Garden's Volunteer Associates.

Honorary President. Dr. D. T. MacDougal, a member of the Corporation of the New York Botanical Garden, has been appointed an Honorary President of the Seventh International Botanical Congress to take place in Stockholm, Sweden, in July 1950. Dr. MacDougal was on the scientific staff of the Garden from 1899 to 1906, when he resigned to become Director of Botanical Research for the Carnegie Institution of Washington. He is now living in Carmel, Calif.

Rose Festival. Photographs of the New York Botanical Garden's rose garden are among those being shown in Philadelphia the second week in June at the festival of the Philadelphia Rose Society in the auditorium of the Strawbridge & Clothier store.

Life Membership. Dr. A. B. Stout was recently elected to life membership in the Wisconsin Academy of Sciences, Arts and Letters. In early 1946 the Academy published an extensive account of the bur oak openings in Wisconsin, which Dr. Stout condensed for the Journal of the New York Botanical Garden, where it appeared in August of that year.

Appointment. George Spalding, a student gardener at the New York Botanical Garden in 1941-42, has been appointed Acting Superintendent of the new Los Angeles State and County Arboreum at Arcadia, Calif., where he went as Propagator the first of the year.

Meetings. Dr. William J. Robbins attended the annual meetings of the American Philosophical Society in Philadelphia April 21-23 and the National Academy of Sciences in Washington the three following days. On April 2 he attended a session of the Postdoctoral Fellowship Board of the Atomic Energy Commission of the National Research Council, and on April 8 the Committee on Research of the American Philosophical Society in Philadelphia.

Lectures. The Little Gardens Club of New York City heard Dr. William J. Robbins April 4 in a talk on the Botanical Garden's activities.

In Philadelphia May 18, the Society of Sigma Xi heard Dr. W. H. Camp at the Morris Arboretum on "The Modern Horticultural Plant — A Product of Biological Engineering." "Principles of the New Systematics" was the topic of Dr. Camp before Phi Sigma at Hunter College May 12 and "A Footnote on the New Systematics" before the Yale Botanical Club in New Haven May 2.

Meeting an emergency when a promised motion picture was not made available, E. J. Alexander spoke before the Barnard Botanical Club May 5 on "Flora of the Southern Appalachians."

G. L. Wittrock showed the Garden's long film of "Scenes and Activities" before an audience of 100 in Woodhaven, N. Y., April 26.

On May 7 Dr. P. P. Pirone spoke on "Garden Pests" over radio station WJZ.

Dr. H. N. Moldenke gave an address on "The History of Man's Relation to Nature" at the J. Otis Swift memorial meeting in Colonial Mansion, Van Cortlandt Park, May 14. The event was arranged by the New York *World Telegram,* for which Mr. Swift for many years had written a nature column and recorded activities of the Yosian brotherhood, of which he was the founder. Dr. Moldenke was also the principal speaker

May 4 at the annual convention of Phi Epsilon Phi national botanical honor society at the University of West Virginia. His subject was "The Land of Mañana." On April 19 he lectured on "Plants of the Bible" at the Congregational Church in Plainfield, N. J.

Groups. Among the organizations which have recently met at the New York Botanical Garden are the New York unit of the Herb Society of America May 16 and the Bronxville League of Women Voters May 9. Students from Long Island University visited the laboratories April 14.

Visitors. During late April and May the Garden's visitors included C. O. Rosendahl, retired professor of botany from the University of Minnesota; Chester W. Emmons of the National Institute of Health, Bethesda, Md.; Rhoda W. Benham of the College of Physicians and Surgeons, New York; Roland M. Riddell of the London School of Hygiene and Tropical Medicine, who is in the United States on a Commonwealth fellowship; George W. Thomson of the Cranbrook Institute of Science; Charles Thom of Port Jefferson, L. I.; and Violet W. Stevenson, horticultural writer from London and Chippenham, England.

Staff Conference. Richard S. Cowan gave "Remarks on Hawaiian Botany" at the staff conference of the Garden May 5.

Wild Flower Chart. Samuel H. Gottscho, photographer, and a member of the New York Botanical Garden, is the illustrator and compiler of a wild flower chart that was issued in April by *Woman's Day* magazine. The chart, which measures 33 x 24 inches, contains full-color photographs of 98 common wild flowers, arranged in the order of their blooming, month by month, from the skunk cabbage of early April to the witch-hazel of late fall. Photographs are also shown of five types of locations where wild flowers of different sorts can be found: dry and rocky woodland; low woodland and brookside; dry pasture, meadow, and roadside; wet pasture, meadow, and ditch; and a woodland and its fringes. After the common and botanical name of each species, beneath the picture of the plant, a brief note is made of the principal identifying marks and the type of location where the plant can be found. Copies of this chart, an example of which hangs outside the Garden's library in the Museum Building, may be obtained from *Woman's Day* magazine, 19 West 44th St., New York 18, for 20 cents apiece plus 15 cents for each mailing to one address.

Mr. Gottscho's kodachromes of wild flowers have been seen on several occasions at the New York Botanical Garden, and his black-and-white photographs have been on exhibit in the Museum Building. He has, in addition, provided a number of illustrations for Journal covers and articles, and he is the author of an article to be published here during the summer.

Tree Festival. The golden rain tree (*Koelreuteria paniculata*) provides the occasion every year for a festival in New Harmony, Indiana.

The occurrence of the golden rain tree in this mid-western town dates from a seed which was planted in 1828 by Thomas Say, the naturalist. Although the tree is of oriental origin, the seed was brought from Mexico by William Maclure and was planted at the gate of the Maclure mansion in New Harmony. The seed sprouted and grew into a tree which today towers above all the surrounding landscape. Its location at the gate has given it the local name of "gate tree."

Seeds from this tree have sprouted so prolifically that today the entire town of New Harmony is ornamented with golden rain trees. The shedding of the yellow petals after the blooming period, which comes between June 15 and 20 there, gives the name to the tree and the occasion for the local ceremony.

The festivities in this town, which since its founding in the early 19th century has been a haven for at least two sects of people seeking to establish an ideal form of communal life, involve square dancing in the street, a parade, prizes, a pageant and the annual selection of a Golden Rain Tree Queen.

A specimen of *Koelreuteria paniculata* in front of the Museum Building at the Botanical Garden generally blooms about the first week in July. In the Garden's "Catalog of Hardy Trees and Shrubs" published in 1943, the description of this Asiatic genus reads: "Oriental trees with pinnate leaves and large terminal panicles of yellow flowers followed by light brown bladder-like fruits and bronze foliage in fall. Easily cultivated and deserving of greater popularity."

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

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THE NEW YORK BOTANICAL GARDEN
and what it means

TO THE INSTITUTION, membership means support of a program that reaches several hundreds of thousands of persons annually.

Briefly, this program comprises (1) horticultural display, (2) education, (3) scientific research, and (4) botanical exploration. To further this work and to disseminate useful information about plant life to the public, the Garden issues books and periodicals, both scientific and popular, and presents lectures, programs, radio broadcasts, and courses of study in gardening and botany. The laboratories and large herbarium and library serve the staff in its research and educational work, while the extensive plantings at the Garden give the public vistas of beauty to enjoy the year around. The public is also free to use the Botanical Garden's library, and, under direction, to consult the herbarium.

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* * * *

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* * * *

Classes of membership in the New York Botanical Garden in addition to Industrial Memberships are:

	Annual Fee		*Single Contribution*
Annual Member	$ 10	Member for Life	$ 250
Sustaining Member	25	Fellow for Life	1,000
Garden Club Affiliation	25	Patron	5,000
Fellowship Member	100	Benefactor	25,000

Contributions to the Garden may be deducted from taxable incomes.

Contributions to the Garden are deductible in computing Federal and New York estate taxes.

A legally approved form of bequest is as follows:

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Gifts may be made subject to a reservation of income from the gift property for the benefit of the donor or any designated beneficiary during his or her lifetime.

All requests for further information should be addressed to The New York Botanical Garden, Bronx Park, New York 58, *N. Y.*

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

JULY

1949

IN THIS ISSUE:

GOLDEN AGE OF
WILD FLOWER
ILLUSTRATION

FIRST OF A SERIES
ON SHADED GARDENS

GIANT SEQUOIA
IN RHODE ISLAND

CONIFER COLLECTION
DEDICATED

FLORAL FLYER
CHRISTENED

GIANT BAMBOO
BROUGHT BACK FROM
SOUTH AMERICA

PAGES 145—168

VOL. 50 NO. 595

CENTS $1.50 A YEAR

SWALLOWTAIL ON BUDDLEIA

SUMMER AT THE BOTANICAL GARDEN

No More Walking

In Bronx Park there are 230 acres of grounds for the public to enjoy at the Botanical Garden, and, with the tractor train in operation there will be for the first time (except for Garden Week in 1945) a means of conveyance around the grounds for those who do not wish to walk. The tractor trains run on Saturdays, Sundays, and holidays.

Roses in Summertime

Even after the exuberant flowering of early June, the roses will continue to bloom to some extent throughout the summer, and will put on a show of color again in October.

Conservatory and its Environs

In the vicinity of the Conservatory, the herb and vegetable gardens, the borders of annuals and perennials, the waterlily pools, the adjacent formal beds, and the Japanese iris and lilies are plants and plantings that are worthy of repeated visits. The Conservatory itself contains unique groups of tropical plants to be seen the year round. In summer it is open daily from 10 to 4:30.

Rock Garden and Shrubs

Although the rock garden and the collections of flowering shrubs on the grounds are at their best in spring, there are always plants of seasonal interest to be seen in summertime—species of *Campanula, Gentiana,* and many others in the rock garden, and among the shrubs, varieties of *Buddleia, Hydrangea, Hibiscus syriacus,* and others.

Conifer Collection

For enjoyment every month in the year is the new Montgomery Conifer Collection, dedicated May 26, in the southern part of the grounds.

Museum Exhibits

Watercolors by Sidney Armer. Sixteen paintings, principally of wild flowers found near his home and grown in his garden at Fortuna, California, are the contribution of Sidney Armer to the summer's exhibits at the New York Botanical Garden. They are done in watercolor against a black crayon background. Among the flowers shown are the matilija poppy, Diogenes' lantern, godetia, pitcher-plant, and western species of dogwood, trillium, and other flowers, besides two especially striking portraits of a squash blossom and the thistle-like head of an artichoke in full bloom.

Photographs by John Roche. Also on view this summer, on the mezzanine, are 16 nature photographs by John P. Roche of Caldwell, N. J. Subjects include seed-pods of *Lunaria,* a swallowtail butterfly on *Buddleia,* wool-sower galls on oak, praying mantises, birch polypores, and leaf scars on twigs.

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JOURNAL

of

THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 50 JULY 1949 NO. 595

The Golden Age of Wild Flower Illustration in America

A Brief Survey of Some of the Popular Guides Of the Seventies and Eighties

By Samuel H. Gottscho

A few years ago I became interested in taking color slide photographs of our native wild flowers for composition and design and soon they claimed my attention for their own sake. I had been familiar with the much pampered flowers of the garden as a photographer of them for many years. In contrast, I now marveled at the beauty of these wildings, at their adaptation to their environment without any helping hand, and at the way they were ready to greet us at the same time and place each year.

This new and absorbing study soon brought to me a secondary interest — that of wild-flower literature and illustration. As many excellent books with their accompanying pictures were long out of print, I found it necessary to haunt the second-hand book shops for this material. This has become a third-related hobby and quite exciting at times. It means delving into the grimy shelves of the stores, seeking books current many years ago but now unobtainable from the publishers or regular dealers in new books. During the last few years I have spent many hours and days in this engrossing search and feel that I have been richly rewarded, for my collection of books now passes the hundred mark. They are housed in some book shelves located in a pleasant corner of my home where a good lamp and a comfortable chair are near enough to bring them within arm's reach. During spring, summer and autumn, I bring many specimens here for identification, comparing them with the excellent book illustrations and the accompanying text.

But it is from December to April that this corner is even more active. During these months field work is suspended and it is then that I browse among these volumes to further my knowledge and, by familiarity with the pictures, to learn to recognize readily many species not yet found in their habitat.

And I do love these old books whose owners had tastes and predilections like mine. These unknowns who loved Nature and wild flowers could have been my companions and good comrades on many botanical excursions. It is easy to understand how their books reached the old-book shops, for unsympathetic heirs are inclined to dispose of such unwanted volumes to second hand dealers. I have a real delight in rescuing books like these from ignoble surroundings and making them honored members of my collection.

I owe the forgotten authors of these books a great debt. Nearly all of them have long since gone to their reward, but their good work is still carried on by their writings. Their love and enthusiasm for their subject have inspired me, and perhaps I can repay these kindred spirits of long ago by acquainting this present generation with the merits of what they wrote. I shall list some of their works, appraising them in terms of what they meant to me and their value to others.

Before I introduce these wild flower books, I must describe one of a great number of its kind which was exceedingly popular over one hundred years ago, or from 1830 to 1860. These purported to be botanies but were really filled with sentimental trash and bore as much relation to a real botany as a work on astrology would to a great book on astronomy. There was much to do in them about the language and meaning of flowers, and fair maidens and anxious swains were quite conversant with the sentiments they contained.

I have in my hand "Flora's Lexicon," a book bearing the copyright of 1839 but piratically reprinted in 1858. The book has embossed red and gilt covers with floral designs. Here is the title page — "Flora's Lexicon, an Interpretation of the Language and Sentiment of Flowers with an Outline of Botany and a Poetical Introduction." The illustrations consisted of four hand-colored bouquets of garden flowers, garish in color and crudely executed. I quote a bit from the poetical introduction:

"The little Blue Bell lifts its head
The Amaryllis beside,
Emblems upon their grassy bed
Of Lowliness and Pride."

And in the same vein:

"Hope smiles amid the blossoms white
That crown the Hawthorn bough,

note or call has its twin echo. A "mocking-thrush" he is, indeed, for he mimics his own song from morn till night in all the thickets and pasture-lands. Take care there! why, you almost trod upon that feathery tuft of "Dutchman's breeches." Oh, who is he that dared to clothe this sweet blossom in such an ignominious title? Where is the Dutchman that ever wore unmentionables of such exquisite pink satin as that pale *dicentra* wears? No wonder their little broken hearts droop at the insult!

The grotesque Jack-in-the-pulpit, rising above

THE COLUMBINE.

An example of William Hamilton Gibson's art in portraying wild flowers, taken from his book of 1880 entitled "Pastoral Days."

And in the Myrtle's leaflets bright
Love softly breathes his vow."

And so on, *ad nauseam.*

The flowers are alphabetically arranged from "Acacia" to "Zinnia" and here is a sample of the pseudo-botanical information available in the scientific(?) section of the book:

"Columbine, *Aquilegia,* Class 13 Polyandria Order Monogynia. This graceful flower has long been a favourite inhabitant of the rustic flower border and is commonly found in the open places of forests, or extensive woods. It has been made the emblem of folly:—why, it is difficult to say."

Before we leave this example of sentimental botany, let us examine the list at the back of the book:—"Almond, Indiscretion; Mignonette, your qualities surpass your charms." There is also an index of flower interpretations — for instance, if you should want to tell the fair one, "Forever thine," be sure to send her a dahlia, or if the sweet message you would like to transmit be "Think of me," you could send her a nosegay of heartsease and she would understand.

We turn now from these romantic expositions and take note of the title page of the first wild flower book in the collection — "Uncle John's Flower Gatherers, a Companion for the Woods and Fields" by Jane Jay Fuller, 1869. The title page bears this quotation — "Consider the lilies of the field how they grow."

This is the story of Uncle John, a young man who became a wheel chair shut-in as the result of a stage-coach accident which occurred while he was making a trip west to study natural history. Every Saturday the children of the neighborhood bring him wild flowers. He identifies their specimens and at the same time, teaches them the elements of botany. It is a quaint, naïve little book, the forerunner of some other later children's wild flower books.

Scattered all through the writings of Henry David Thoreau and John Burroughs are constant references to wild flowers, many of which have been quoted by various authors mentioned here. However, neither wrote a book especially treating of wild flowers, although this does not minimize their standing at the two greatest nature writers of the century.

In 1878 appeared "Native Flowers and Ferns of the United States in their Botanical, Horticultural and Popular Aspects," originally published in parts. This very important work of its time was written by Thomas Meehan, editor of the then "Gardener's Monthly" published in Philadelphia in the seventies and eighties. I have the four volumes of the first and second sets. The illustrations are by Alois Lunzer and reproduced by L. Prang and Company in chromo-lithographs.

This is early color-engraving work, most color pictures until this time being hand-colored engravings. Occasionally there is a lack of registration

on some of the plates, but most of them are good botanical studies. The text is not dry, scientific or botanical description, but is written in a popular style, detailing the historical and mythological facts about each flower with much attention being paid to the origin of its name.

Thomas Meehan was a most important figure in horticulture for several decades and a great lover of our native flowers. When *The Gardener's Monthly* which he had edited for thirty years was discontinued on account of the publisher's death, he and his three sons shortly after started *Meehan's Monthly* in July 1891.

I have the complete set of this magazine, which ran for about twelve years. This was planned in part to be a continuation of "Wild Flowers and Ferns" and each issue contained a color plate and several pages devoted to Nature and wild flowers, although the main topics of the magazine were horticulture and gardening. The 138 color plates which appear in these eleven volumes reflect the advance in color printing in the twelve years which had elapsed. The quality, registration and color are much improved and the monthly wild flower sections contain a wealth of material on Nature and our native flora.

The foremost botanical artist of the eighteen-seventies and early eighties was Isaac Sprague, born 1811 and died 1895. Audubon mentioned him in his Journal of the New England trip under date of August 19, 1840 — "Saw some very remarkable Drawings of birds (far better than any ever made by the Immortal Alex^{r} Wilson) by a young man named Sprague." In the summer of 1843 when Audubon made his trip up the Missouri River, he took Isaac Sprague along as botanical artist. My first contact with his work resulted from the purchase of a fine copy of "Beautiful Wild Flowers," a handsome Victorian gift book, bound in embossed cloth, gold stamped and with gilt edges. The text was the work of the Reverend A. B. Hervey illustrated with fourteen watercolor drawings by Isaac Sprague. This book was published by S. E. Cassino in 1886, although the copyright notice was dated 1879. The lithographic reproduction of the plates is very good and the pictures are beautiful portraits of our native wild flowers.

A few words as to his standing as a natural history artist are pertinent: The introduction to the second set of Dr. Meehan's books makes mention that his own illustrator's work compares favorably with that of the renowned Isaac Sprague.

A noteworthy contribution to Asa Gray's writings was the collection of 200 line drawings made to illustrate the "The Genera of the Plants of the United States." In the preface to this work Dr. Gray states: "The figures are drawn directly from nature by Mr. Sprague, and from the living plants wherever that is practicable . . . And, although I am alone responsible for the text, I must in justice add, that whatever of original value these illustrations may be found to possess, is largely owing to the

TWO CARDINAL FLOWERS APPEARING IN BOOKS OF THE "GOLDEN AGE"

At the left is a color plate of *Lobelia cardinalis* by Isaac Sprague, from "American Wild Flowers" by Dr. George Lincoln Goodale. The same flower is depicted at the right in color by Alois Lunzer in "Native Flowers and Ferns of the United States" by Thomas Meehan. Reproduced by Prang in chromo-lithograph, this shows one of the first attempts at color engraving. The author has photographed these pictures and the one on page 147 from the original books.

scientific insight and the careful investigations of Mr. Sprague, as well as to his skill and accuracy in delineation."

His pencil illustrated Torrey's *Planta Fremontianae* and all of Dr. Gray's classical memoirs on the plants collected by Charles Wright and others on the southwest border of the United States and his report on the plants collected by the Wright expedition.

John Torrey named a plant after him, *Spraguea umbellata,* and describing it states, "I have dedicated this genus to Mr. Isaac Sprague of Cambridge, Massachusetts, so well known as a botanical draughtsman, and especially for the admirable illustrations of the Genera of the Plants of the United States by himself and Dr. Gray."

I have two other works illustrated with his flower pictures, "Flowers of the Field and Forest," 1896, and "American Wild Flowers" by George Lincoln Goodale, M.D., 1839-1923, with fifty-one illustrations by Sprague. This great Harvard professor of botany has written a text for these pictures which is quite botanical in the introductory paragraphs, but offers further on much other additional information to interest the average reader, covering the background, history and use of these plants and their flowers. The text is printed on heavy antique paper.

I must make room here to mention "Wild Flowers and Where They Grow" by Amanda B. Harris, illustrated with woodcut reproductions of sixty illustrations by Miss L. B. Humphrey and published in 1882 by D. Lothrop and Company, Boston, Mass.

This is also a Victorian gift book, the cloth cover ornately embossed in black, brown and gold. It offers reminiscences of the author's childhood wild-flowering. I would infer from the book that, as a grown woman, Amanda Harris became a good botanist, as is proven by the text of her book. She does know her wild flowers. The book has much nostalgic beauty and radiates love and enthusiasm. I often spend a happy hour with the author as she recounts her childhood adventures with her sisters in locating and identifying the wild flowers that grew in the various parts of her father's farm.

Those of us who were children in the nineties and were privileged to enjoy those estimable juvenile magazines, "Harper's Young People" and "St. Nicholas," may recall the name of William Hamilton Gibson, 1850—1896, the artist-naturalist who contributed to them so many charming nature articles and illustrations.

These and many others published in contemporary magazines were later collected and brought out as books. In the course of several years, I was able to find the following: "Pastoral Days" 1880, "Highways and Byways" 1882, "Happy Hunting Grounds" 1886, "Strolls by Starlight and Sunshine" 1890, "Sharp Eyes" 1891, "Eye Spy" 1897, and "My Studio Neighbors" 1897. Although these books are written about many different phases of Nature, they abound in references to wild flowers which were a particular passion of this writer.

Before the advent of half-tone, the illustrations of his earlier books were reproduced as woodcuts by the great engravers in this medium. The later books show his mastery of the technique adapted to half-tone reproduction.

A consummate natural history artist, William Hamilton Gibson could draw with equal facility, bird, insect, plant or flower and was as well talented in his treatment of the landscape. To this was added (a combination so rare) the ability to write of Nature and express his love and appreciation of all her works. His facile pen could describe the wonders and happenings of the woods and fields in a simple style which could

be understood both by young and old. He was well grounded in botany, entomology and ornithology and his observations of plant and insect life were of great interest to the scientist as well as to the ordinary nature lover. His studies of insect relationship to flowers have been honored by the wild flower writers who followed him, as is evidenced by the many quotations credited to him found in their books.

He had made many drawings for a popular illustrated botany, but this project was cut short by his untimely death in 1896.

His books and illustrations have been an inspiration to me, suggesting many fields of Nature exploration, study and photography, particularly those relating to insects and wild flowers.

The foregoing books were published during the quarter century, 1870—1895. There are possibly others treating also of our native wild flowers found in the northeastern part of the United States and Canada which were published during this period, but I have written only about those in my collection which are of this time and location and with which I am most familiar. It was a golden age for wild flower illustration.

In conclusion, I must mention Mrs. William Starr Dana's "How to Know the Wild Flowers," published first in 1893, which marks the beginning of another epoch in wild flower literature. It was the first popular guide to wild flower identification and the forerunner of many others of this type on that subject as well as others on trees, ferns and fungi. The development of this kind of nature study books is another story, perhaps to be told later.

Under an Apple Tree

A Description of Four Successful Plantings Thriving in Damp Shade

By Frances R. Williams
Winchester, Mass.

"WHAT can you grow under an apple tree?" a skeptical friend once asked of me. My answer was, "Come and see."

The beds under my old apple tree are four in number, all in shade or part shade. The soil is good loam that has been heavily enriched with much compost, bonemeal, dry cow manure and fertilizer. The yard is somewhat damp.

As will be seen, the most reliable group of plants I use is the genus *Hosta* (for many years known to gardeners as *Funkia*). The beds are approximately 6 x 15 feet in size. Radiating out from the trunk, they

FEW gardeners have the amount of shade combined with dampness that Mrs. Williams has to combat on her 100 x 140 foot suburban lot. Yet in this New England garden that she has been cultivating for a score of years and more, she has colorful flowers and dramatic foliage patterns alternating from early spring until late fall. A specialist in the genus *Hosta,* of which in 1944 she gave the New York Botanical Garden a collection of twelve species and varieties, she has used these plants effectively throughout her grounds. Her gardens are shaded chiefly by a venerable apple tree, an old row of willows, and a large elm. There are also three massive spreading junipers on her place and a small hemlock hedge. The article published here is the first of three to describe the plants with which she has had success under these difficult conditions. At the conclusion of the series, a list of her shade-garden plants will be published, with common and botanical names.

—C. H. W.

extend a little beyond the branches of the apple tree, but still within its shade. At the back is Virginia creeper on a fence, and a sparse thin hedge of clipped hemlock.

In one bed is Oregon grape and beauty-berry, and against these are plantain-lilies — the short-cluster one (*Hosta Sieboldiana*), with its large gray leaves, and a green-leaved seedling of *H. Fortunei* var. *marginato-alba,* combined with several large jack-in-the-pulpits which have many seedling jacks around them.

The wavy-leaved plantain lily (*H. undulata*) and *Trillium grandiflorum* are in front. A few seedling sweet rockets and violets have crept in. White baneberry is also here, and a bit of Jacob's-ladder. In spring the English bluebell (*Scilla nonscripta*) and star-of-Bethlehem can be seen in this bed.

The second bed has, as its main feature, several plants of *H. Fortunei* var. *marginato-alba,* large-leaved with white edges, intermingled with some of the light green, fragrant plaintain-lily (*H. plantaginea*). The first is crowding out the second *Hosta.* Pieces of wavy-leaved plantain-lily are at the edge and the spring vetchling (*Orobus vernus*) at one end. At the other end is the yellow archangel (*Lamium Galeobdolon*), a lovely thing but a rank spreader. It needs to be kept in bounds by slates set on edge. Jacks pop up in this bed, red-coated seeds having been thrown about in the fall. A few trumpet daffodils and giant snowdrops are planted here.

The third bed, somewhat larger and triangular, has a beautiful stand of maiden-hair fern (plenty of compost on this) and queen-of-the-meadow,

with a large mass of the double tawny daylily with variegated leaves. This has grown so appallingly that it is crawling into the lawn, which is only of pocket-handkerchief size.

Blue plantain-lily (*H. caeruela*), with its large strong dark green leaves, is at one corner, where it contrasts with the smaller plantain-lily which has a little thin white line along the edge of each leaf (*H. lancifolia* var. *albo-marginata*). *Astilbe japonica* is tucked in among them.

One of the white *Astilbe Arendsi* hybrids is here next to the plantain-lily which in the spring has yellow leaves edged with green (*H. Fortunei* var. *viridis-marginata*). Tall yellow Canada lily grows by accident at one side. The double narcissus "Cheerfulness" bloomed here in 1948. Pink lily-of-the-valley and white flowered myrtle run throughout among the stems of the other plants.

This bed sounds very full of leafage and is, but the varied shapes of the leaves present such a contrast, and the shades of green add so much interest, that it is a great joy. The bloom, though not extensive, comes mostly from the flat white clusters of queen-of-the-meadow, the purplish flower of *Hosta caerulea,* and the large daylily.

The fourth bed, against the hemlock hedge, is carpeted in early spring with lesser celandine sparkling with yellow flowers. By midsummer the leaves of this have dried up and completely vanished.

Shaded beds of flowering plants and ferns beneath an apple tree and to the north of it in Mrs. Williams' Massachusetts garden.

Hosta Fortunei* var. *viridis-marginata* grows here in the shade with *Filipendula Ulmaria.

In this bed is a stretch of the low October-blooming *Hosta lancifolia* var. *tardiflora,* with its powdery bluish lavender flowers bunched toward the end of a twelve-inch stalk. Chervil grows under the hedge. The wavy-leaved plantain-lily (*H. undulata* var. *univittata*) is at one end, a white stripe down the center of each green leaf, and at the other end is the blunt plantain-lily (*H. decorata*), sending stolons underground. This is a very satisfactory species, giving a pleasant effect with its rounded leaf bordered in white and its purplish flowers in August.

The pink lily-of-the-valley has run into this bed and there is some Canada lily from seed thrown in. There are a few plants of *Trillium grandiflorum, T. luteum,* and *T Hugeri,* these last two with mottled leaves. At the back are a couple of beautiful cinnamon ferns, a large plant of a white-flowered, small-leaved plantain-lily (*H. minor*), and Virginia water-leaf.

All this is under an apple tree — with plenty of food — in a shady back yard.

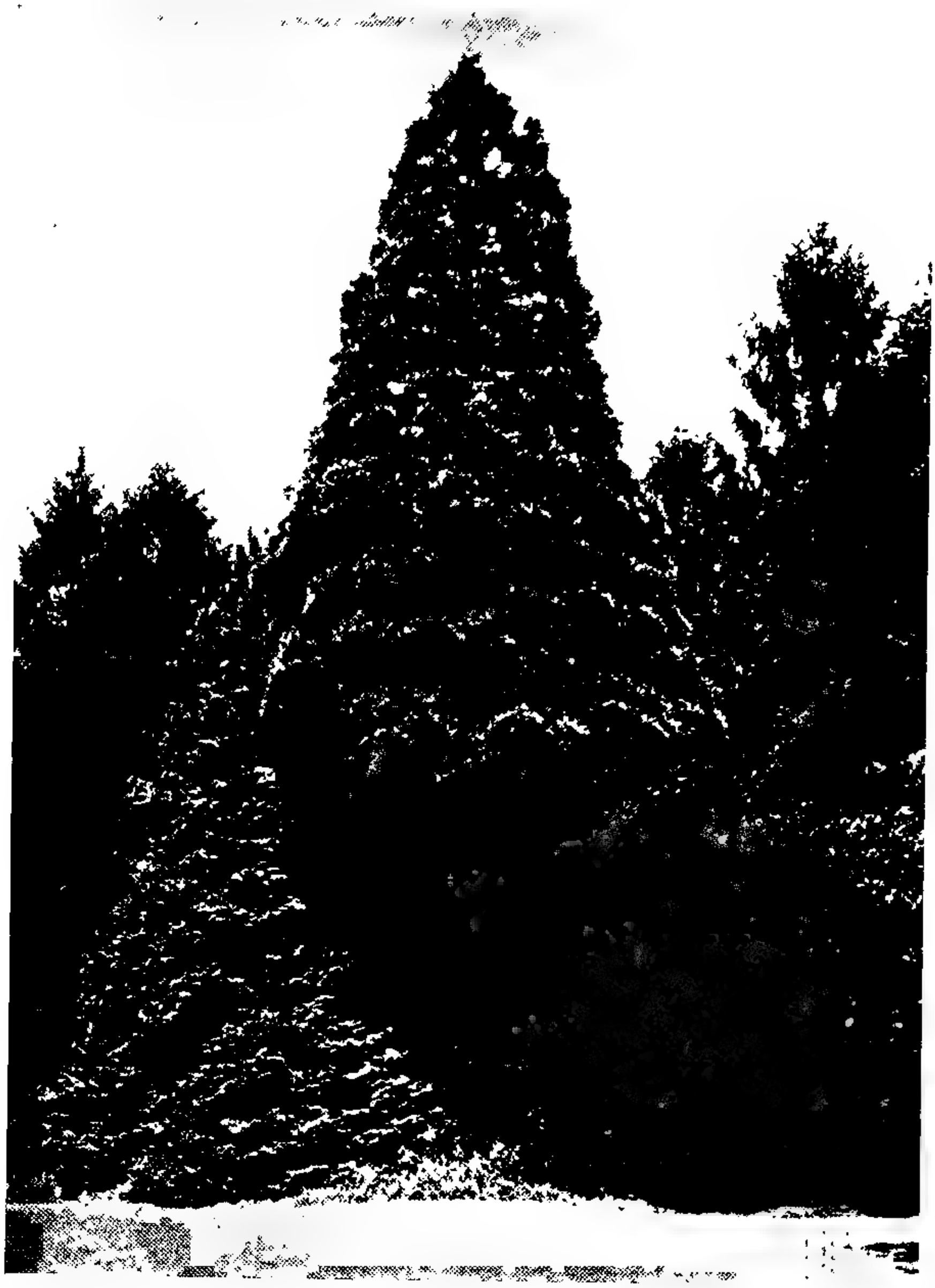
* * * *

Since this was written, the tree situation has changed. Recently more limbs had to be taken off the old apple tree to make it safe to walk under and the heavy top of foliage was cut off entirely. This left two trunks going skyward with small leafy branches going out from each trunk. I

In the west bed, shown at the left, is the autumn-flowering plantain-lily, *Hosta lancifolia* var. *tardiflora,* as it was photographed on Oct. 5. To the east of the apple tree, but still within its shade, is *H. Sieboldiana,* in full bloom July 5, with the white and green leaves of *H. undulata* in front.

kept the old trunks, chiefly because I like them as old friends and I still got a little shade from the growth at the top, but apparently not enough, for the maidenhair late last summer looked most unhappy.

In the spring of 1949, I added on the southwest side, where all limbs were gone, a katsura tree (Cercidiphyllum japonicum) 14 feet high, very near the apple tree trunk, and a goldenrain tree, (Koelreuteria paniculata), 7 feet high, a few feet away. These two trees are but 12 feet apart and will, of course, be much too near when they grow into large trees, but I decided that in this way I could fill in the gap for the next ten or fifteen years to make shade for the maidenhair and other plants, and have trees in my yard the leaves of which I enjoy watching.



A GIANT SEQUOIA IN THE EAST

This 64-foot specimen of *Sequoiadendron giganteum* is growing, surrounded by smaller conifers, at Bristol, Rhode Island.

For the story of this tree, turn to page 158.

A Giant Sequoia in Rhode Island

WHEN the Journal in May 1947 published an article under the title "The Largest Sequoia East of the Rocky Mountains," there was more than one response to contradict this claim concerning the specimen of *Sequoiadendron giganteum* (*Sequoia gigantea*) in the John J. Tyler Arboretum at Media, Pa. One, coming from John C. Wister, speaks of a large tree reputed to be growing at Atlantic Highlands, N. J. Further information on this would be of interest. Now, as definite proof of a larger tree in the East, Mrs. George A. Lyon sends a photograph of a specimen of the California big tree, or giant sequoia, on her estate at Bristol, Rhode Island.

When measured on July 29, 1948, Mrs. Lyon's tree stood 64 feet tall and was 8 feet in circumference four feet above the ground. At the base it measured 11 feet 8 inches in circumference. (The Pennsylvania tree is approximately 40 feet tall, but it is said that the leader has twice been cut by vandals. The girth is about the same as that of the Rhode Island specimen.)

The tree on Mrs. Lyon's estate has been growing in her sheltered garden since 1903. "At the time it was transplanted," she writes, "it was about 12 feet tall. It was bought for our family by Mr. John De Wolf, who had been connected with Prospect Park in Brooklyn for some years. The tree has never had any special care, but seems to like its situation near the shores of Narragansett Bay.

"The two hurricanes never bothered it at all, though many of the other evergreens crashed around it. (We lost 283 trees in the 1938 blow and 75 in 1944.) I believe this to be the only sequoia of any size growing in New England."

Since the tree at Bristol is on a private estate, it is not accessible to the general public. However, Mrs. Lyon writes that if an interested person wishes to see the tree, he may obtain permission from the superintendent, Arthur B. Rae, Ferry Road, Bristol, R. I.

Report on Rose-Growers' Day

THE next issue of the Journal will present a report on Rose-Growers' Day, which took place June 9 at the New York Botanical Garden. A later number will contain the treatments and formulas suggested by W. E. Fleming for control of the Japanese beetle.

Conifer Collection Presented By Colonel Montgomery

"ON the whole, I have received more than I have given." These were the opening and concluding words of Colonel Robert H. Montgomery in presenting the collection of choice conifers from his estate at Cos Cob, Conn., to the New York Botanical Garden on May 26.

Approximately 200 specimens were selected from the 700 or more on his property there, and these have been landscaped over an eight-acre area at the south end of the grounds by the New York Botanical Garden's horticultural committee, Henry F. du Pont and Marian Cruger Coffin.

Names for the labels on the trees were supplied by Henry Teuscher, Curator of the Montreal Botanical Garden, who had been familiar with the

THE FORMAL OPENING OF THE MONTGOMERY COLLECTION

Mrs. Robert H. Montgomery cuts the cord across the entrance, while her husband, officers of the Garden, and others look on. The inspection of the planting, which followed the dedication address and acceptance in the Garden's lecture hall, was in turn followed by tea for members of the Garden in the Museum Building.

A general view of a portion of the eight-acre planting which was dedicated May 26 at the New York Botanical Garden as the *Montgomery Conifer Collection.*

collection in its early years. At the dedication ceremony Mr. Teuscher gave an address which will be published in this Journal. Mr. Teuscher's talk concluded with the christening of the new dwarf spruce which was described in the May issue of the Journal as *Picea pungens* var. *glauca* clone "R. H. Montgomery." A young plant which he had raised from a cutting from the parent plant was then presented to the Garden.

Colonel Montgomery told informally of how he had started his collection of conifers.

"Somebody told me that if I had the right kind of hobby it would add ten years to my life," he confessed. "An *Atlantic Monthly* article by George P. Brett, who then had a notable pinetum in Fairfield, Conn., inspired me to start a conifer collection as my hobby."

Talking of the beauty of the conifers under all conditions, he said, "Through a microscope, the winter buds of conifers are as beautiful as any rose, and in spring the colors of the trees make a wonderful picture."

Reverting to the theme of the hobby, Colonel Montgomery, who is now 77, continued, "My ten years were up some time ago, so I started palms

as a hobby to add another ten years to my life. That ten years has also passed . . ." and he called for suggestions for a third hobby for the next decade. His palm hobby resulted in his founding of the Fairchild Tropical Garden in Coconut Grove, Florida. A book depicting the first ten years of its growth has recently been issued.*

Joseph R. Swan, the Garden's retiring president, introduced Colonel Montgomery to the audience, and the conifer collection was accepted for the New York Botanical Garden by Charles B. Harding, newly elected president. A trip to the planting, led by forty guests in the Garden's new tractor train, followed the ceremony, after which tea was served in the Members' Room in the Museum Building.

Colonel Montgomery contributed folio plates of conifers, in color, from the *Pinetum Brittanicum,* for an exhibit in the Museum Building during the last two weeks of May.

*Reviewed in this Journal in June 1949.

The Botanical Garden's Annual Meeting

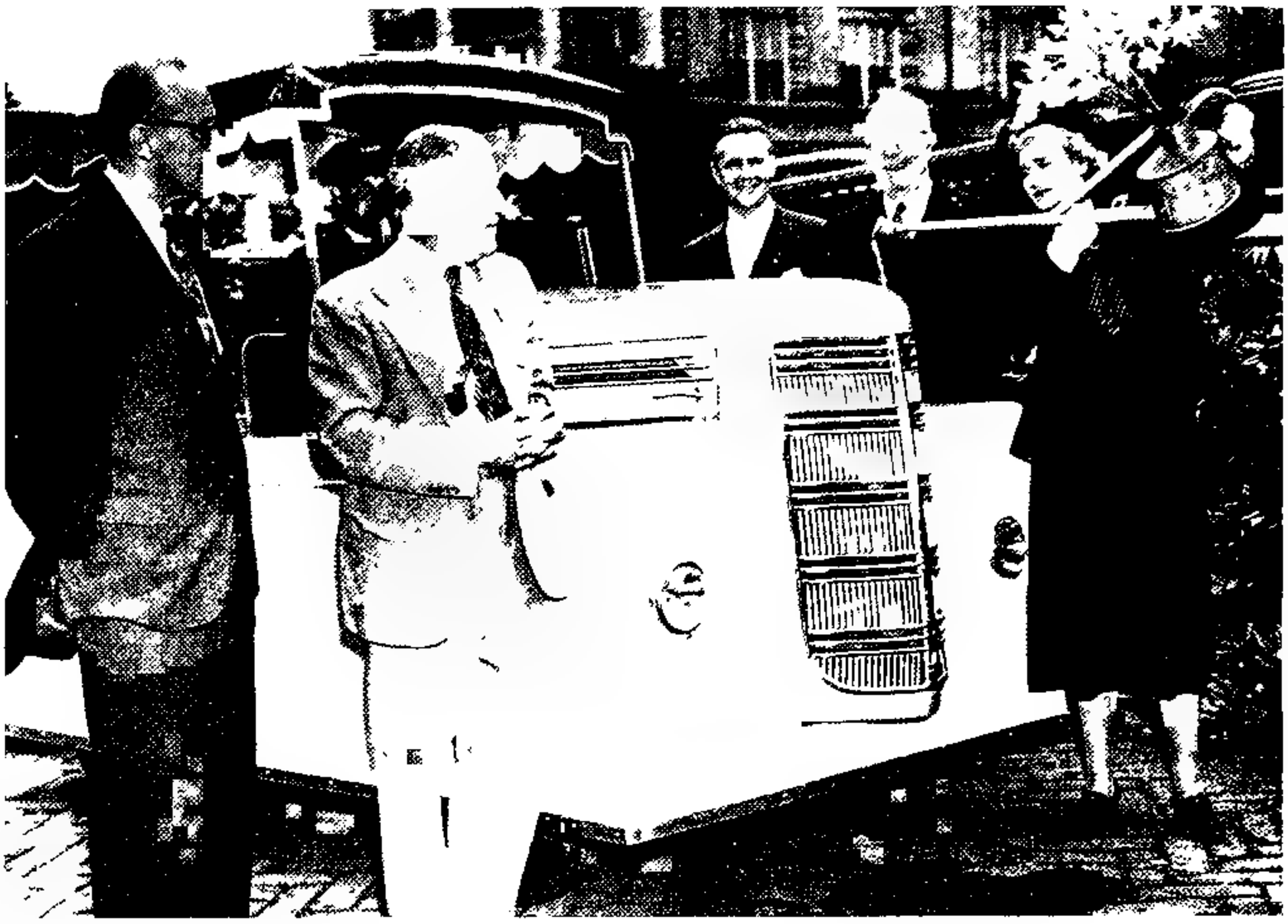
Corporation Meeting. At the annual meeting of the Corporation of the New York Botanical Garden on May 26, the executive committee's nominations of 30 new Corporation members were approved by oral vote. Of these, seven had been elected to the Advisory Council within the past few months. They are: Mrs. John D. Beals, Jr., Mrs. Percy L. Douglas, Mrs. Ethelbert Ide Low, Mrs. Harold R. Mixsell, Mrs. Hermann G. Place, Mrs. Paul Sturtevant, and Mrs. Thomas J. Watson. Others in the new list are: Douglas H. Allen, Mrs. John Holme Ballantine, Charles C. Burlingham, Mrs. Erastus Corning II, C. Suydam Cutting, Mrs. Lyman Delano, Lynn Farnol, Mrs. J. Horton Ijams, Mrs. Francis K. Kernan, Sidney Lanier, Mrs. Blake L. Lawrence, Mrs. Madison H. Lewis, Mrs. James W. Maitland, F. Cleveland Morgan, Mrs. John E. Parsons, Mrs. H. Harvey Pike, Mrs. Fergus Reid, Jr., Mrs. Clarance Stanley, Mrs. Henry Steeger, Mrs. Donald B. Straus, John C. Traphagen, Mrs. Philip B. Weld, and Mrs. Andrew Murray Williams.

As announced on the inside front cover of last month's Journal, the Corporation passed an amendment to the by-laws creating the new post of Chairman of the Board.

Eight managers were re-elected to serve in the class of 1952. They are: Sherman Baldwin, William Felton Barrett, Edwin De T. Bechtel, Henry F. du Pont, Rev. Robert I. Gannon, S.J., Mrs. Harold I. Pratt, Edmund W. Sinnott, and Joseph R. Swan.

Board of Managers. Following the meeting of the Corporation of the New York Botanical Garden, the annual meeting of the Board of Managers took place in the lecture hall in the Museum Building the afternoon of May 26. In addition to the election of Joseph R. Swan as Chairman of the Board, Charles B. Harding as President, and Frederick S. Moseley, Jr., as Vice-President, as announced in last month's Journal, Donald P. Rogers was elected Assistant Treasurer, to succeed F. J. Seaver, retired from the Garden's staff. All other officers were re-elected.

Scholarship Fund. The Advisory Council of the New York Botanical Garden



CHRISTENING OF THE FLORAL FLYER

Using a watering-can filled with daylilies as emblematic of the New York Botanical Garden's scientific and horticultural accomplishments, Mrs. Harold I. Pratt pours water over the front of the tractor train which she presented to the Garden. The ceremony took place the day of the annual meeting and the dedication of the Montgomery Conifer Collection, and one of the train's first trips was to take a selected group for the first official view of the conifer planting.

has added $800 to the Garden's scholarship fund in the past year, according to the report read by Mrs. Thomas D. Thacher, Chairman, at the Garden's annual meeting May 26.

A special word of appreciation was expressed for the work of Mrs. Charles Burlingham and Mrs. Grafton H. Pyne who, with others, have been remodeling the permanent museum exhibits on the main floor of the building and who have been installing temporary exhibits from month to month in the rotunda.

Mrs. Thacher succeeded Mrs. Robert H. Fife as Advisory Council chairman last December.

Floral Flyer Christened

SPRINKLING the front of the train from a watering can that was filled with daylilies, Mrs. Harold Irving Pratt, the donor, christened the Garden's new tractor train, *The Floral Flyer*, Thursday noon, May 26, in the presence of staff members who were then taken on the train's first official tour of the grounds. Later in the day the bright yellow, 48-passenger vehicle carried a selected group from the Garden's annual meeting to the Montgomery Conifer Collection and back to the Museum Building for tea.

Regular tours of the Garden began two

days later, and continued over the Memorial Day holiday, May 30. More than a thousand round trips of the Garden were made during the week-end.

The train starts its tours just east of the fountain on the main road in front of the Museum Building, travels along the "snake road" through the woods and across the new bridge over the Bronx River, stops near the Rose Garden, and returns to the Museum Building by way of the Boulder Bridge. The fare is ten cents to the Rose Garden and ten cents additional for the completion of the circuit, which takes a little over twenty minutes. All profits beyond costs of operation, according to the wishes of the donor, are to go toward purchase of a second tractor train.

For the time being, only week-end and holiday operation is planned. The schedule will be increased as requirements demand additional runs.

Letter from Assam

F. KINGDON WARD, who began an expedition on the Burma-India frontier in the spring of 1948 for the New York Botanical Garden and co-operating organizations and individuals, is now well started on his second year of plant collecting in Assam. He is gathering plants for both botanical and horticultural purposes. A letter written by him from Sadiya, near the Brahmaputra River in the extreme north of Assam, tells of some of the difficulties which have been encountered by him and his wife, who has been accompanying him all the way, and also gives a hint of the type of seeds which he is collecting.

"We reached Sadiya at midnight on the 10th of May after our two months' expedition into the Mishmi Hills. It proved a rather tough journey, in one of the wettest springs ever known in this top corner of Assam, where they certainly know what rain is!

"We started off in March with elephants, but were soon forced to take to canoes to get up the river which was already in flood. Even this mode of progress took us only a short way in a long time, as the rapids were unmanageable, after the heavy rain. We then engaged Mishmi coolies.

"Once into the hills the weather was frightful, and we made even slower progress. The population was very scanty and widely dispersed, the mountains being so steep that even the primitive Mishmi cultivation is rarely possible. Hence the transport problem was always difficult. This, as much as an almost total lack of paths, and the everlasting rain immobilized us to a considerable extent. We cut a track through dense forest from 3,000 to over 6,000 feet which resulted in some good finds. The country is wonderfully rich in trees and shrubs, of which many must be quite unknown, and a considerable number might be worth introducing.

"Amongst those of which we brought out seed, I will only mention the following here: A charming *Glycosmis* with scarlet berries and scented white flowers; *Cedrela* sp., one of the finest trees in the forest; *Styrax serrulata,* a lovely sight in full bloom; *Melia* sp., the flowers lilac or almost white; *Cinnamomum* sp., very aromatic; a good form of *Acer oblongum*; *Albizzia* sp., handsome in flower, and might prove a good shade tree in plantations; *Hydrangea* sp.; *Pinanga* sp., a graceful little palm with salmon red fruits; *Sterculia villosa,* a large deciduous tree with handsome leaves; *Euonymus* sp., a remarkable little tree, a single brilliant vermilion seed of which is larger than the entire fruit of any known Indian species."

Sarah Gildersleeve Fife

A PROLONGED illness brought death to Mrs. Robert H. Fife May 20.

Chairman of the Advisory Council of the New York Botanical Garden from Dec. 4, 1940, until her resignation Dec. 2, 1948, Mrs. Fife had given the Garden enthusiastic and devoted service in many ways. She had not only inspired members of the Advisory Council to activity in the interest of the Botanical Garden, but she had also worked eagerly with the Garden's Manhattan office, heading committees, furnishing practical ideas, and inciting those around her to do more and more for the institution.

At the annual meeting of the Garden six days after her death, the following resolution was adopted by the Board of Managers:

In Memoriam

SARAH GILDERSLEEVE FIFE

We, the Board of Managers and membership of The New York Botanical Garden assembled in annual meeting, feel that, through the untimely death of Mrs. Sarah Gildersleeve Fife on May 20, 1949, the Garden has lost a most beloved associate and friend, and we desire to express our sense of the value of the services rendered by Mrs. Fife. As member of the Advisory Council and its Chairman from December 4, 1940 to December 2, 1948 and through membership on other committees of the Board, she gave devoted and loyal service to the Garden.

Her loss will be keenly felt by The New York Botanical Garden, by its Board of Managers, its officers, its staff and by its many committees and workers. Each of us feels a deep sense of personal grief that we no longer shall enjoy the pleasant fellowship with this friend and associate.

RESOLVED that this tribute of love and respect to the late SARAH GILDERSLEEVE FIFE be entered upon the minutes of this meeting and a copy sent to her family with the deep sympathy of the Board and the membership of the Garden.

Mrs. Fife was first chosen for membership in the Advisory Council by the Board of Managers May 19, 1936, and she was elected to the Corporation the following January.

Dr. Maguire Returns from South America Bringing Blowgun Bamboo Lost More Than a Century

WITH the return of Dr. Bassett Maguire June 16 after nearly eight months of exploration in Venezuela, specimens of the giant blowgun bamboo, *Arundinaria Schomburgkii,* have been brought out of South America for the first time since the plant was discovered by Robert Schomburgk in 1839. Explorers who have searched for it in the intervening century have either failed to return with it or have failed to return at all.

To find this monster of the Grass family, from whose slender, 12- to 20-foot internodes the Indians of a single remote jungle tribe, the Maquiritares, make blowguns, Dr. Maguire extended his expedition by seven weeks. With a party of a score of native carriers, and accompanied by his son, Bassett Maguire, Jr., who had joined him in South America the first of the year, he journeyed from near Puerto Ayacucho up the Rio Cunucununa in canoes as far as navigation was possible, then spent 22 days on the round trip on foot through narrow jungle trails amid constant rain. A single day on Cerro Marahuaca was passed in the restricted habitat of the bamboo, which is known to the Indians as CURATA and to the Venezuelans as CORIZA.

The Piarora Indians, north of the Maquiritares, Dr. Maguire said, are the only ones in this region known to make CURARE, the poison with which their neighbors tip their blowgun darts. Extensive trade goes on in these two products, both between these tribes and with others, all the way across the continent, until both blowguns and curare from the seldom-visited villages of these Venezuelan Indians are found in the markets of British Guiana and other east-coast countries.

It is only the lowermost internode of this species of *Arundinaria* which sometimes attains the length of 20 feet. Dr. Maguire brought back several blowguns 14 feet in length, with darts, a quiver for the darts, cleverly made from a palm sheath, and numerous other examples of native craftsmanship.

Living plants, of which he acquired about 40 young specimens, have been sent

Wayside Gardens

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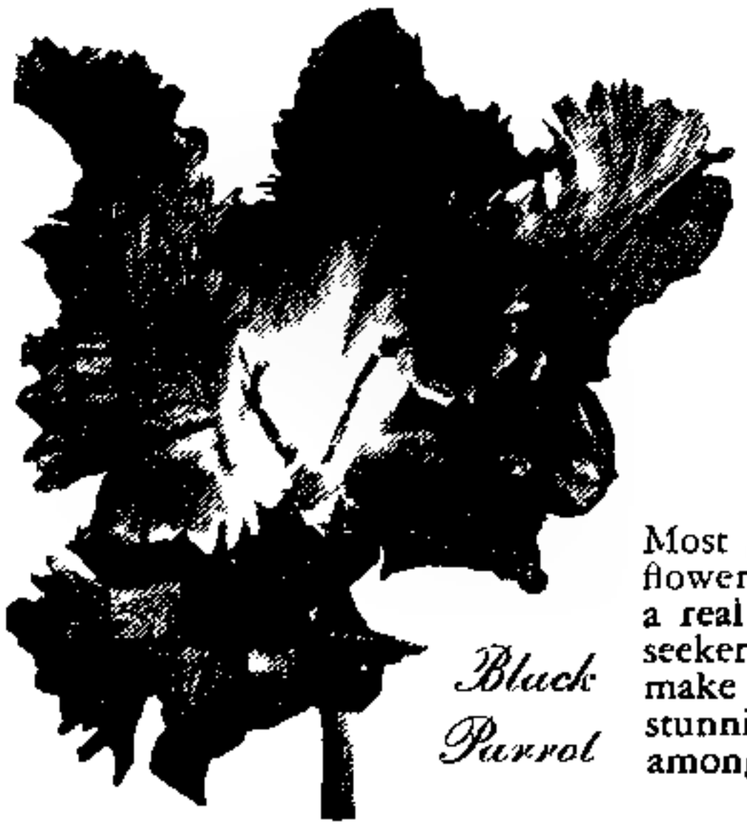

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Wayside Gardens

to the United States Department of Agriculture's Bureau of Plant Industry at Beltsville, Md., to the Escuela Agrícola Panamericana in Tegucigalpa, Honduras, and to the Botanical Garden at Port-of-Spain, Trinidad, for transmittal to Georgetown, British Guiana, and to the Royal Botanic Gardens at Kew, England. Seed was sought, but the season was not right. Herbarium specimens, however, were acquired for the Botanical Garden and for exchange with other institutions.

Cerro Marahuaca, where *Arundinaria Schomburgkii* was found, is east of Mt. Duida and about 150 miles south of Sipapo, and is the highest of all the western mountains in this system. Whereas Schomburgk, more than a century ago, approached the area from the south, Dr. Maguire, traveling by way of the Cunucunuma, went in from the north.

Louis Politi, Arboretum Foreman at the Botanical Garden, who accompanied Dr. Maguire during the exploration of Cerro Sipapo, the primary object of the trip, which was known as the Kunhardt Sipapo Expedition, returned to the Garden March 3 with living specimens of plants of 450 species. More than 100 additional species, half of them orchids, were brought back in June.

Dr. Maguire's herbarium specimens from the trip total around 2,000 numbers, with approximately six examples of each.

NOTICES AND REVIEWS OF RECENT BOOKS

A Rich Flora, Richly Treated

FLORA OF KALAMAZOO COUNTY, MICHIGAN. Clarence R. & Florence N. Hanes 295 pages, illustrated, indexed. Published by authors, Schoolcraft, Michigan, 1947. $4.

In this monumental piece of work Mr. and Mrs. Hanes have made a contribution which will be an inspiration and a challenge to amateur and professional botanist alike.

That the entire county has been thoroughly and repeatedly explored at different periods of the collecting season is evidenced by the fact that the volume lists 1,749 different taxonomic entities with many detailed notes regarding habitats, exact collecting sites, fruiting periods, and differentiating characters. Of these, 1,340 were found within a 5-mile radius of the village of Schoolcraft. Fifty species are recorded for the first time for the state. It must be obvious to anyone with experience in collecting that only the keenest discriminating observation and patient devotion to the task could locate such a large number of taxonomic entities from a single county.

Some factors which make Kalamazoo County an excellent area for study of its flora are the wide variety of habitats, including many lakes and ponds, various types of swamps, bogs, and marshlands, grasslands and mixed hardwood forests; a high percentage of unpastured woodland and lowland, and the right of ways of four railroads traversing the county. Outstanding floristic features are the numerous Atlantic Coastal Plain species and the relict colonies of extraneous species.

While the user will be dependent for initial determinations of his collections upon standard manuals, still this Flora makes a vital nomenclatorial contribution in that the names are up to date, so that it really constitutes a revision, in so far as this area is concerned, of whatever manual is used.

Moreover, the style of the book is dynamic. Let this gratifying statement serve as an example: "Our observation over many years does not show a very large decrease in the native plants of Kalamazoo County. Several species such as trailing arbutus, the small dogwood

or bunchberry, some of the orchids, and other plants which were never abundant because they were south of their true range, are hanging on precariously in a few protected spots, but for the most part the advance of civilization has been kind to our flora."

RAY C. FRIESNER,
Butler University.

A Satisfying Small Encyclopedia

FAVORITE FLOWERS IN COLOR. E.L.D. Seymour, Editor. 634 pages, indexed, illustrated with 300 four-color photographs. William H. Wise, New York, 1949. $4.95.

This is an interesting, satisfying, small encyclopedia. It will prove a much used desk book. Written by four outstanding plantsmen,* its terse, accurate presentation of fact and procedure attest its worth.

Illustrations fill one half of the book's pages. To this reviewer, they are disappointing, not up to the text's quality. The dark backgrounds do not bring out the color shades; the overcrowded layouts result in such confusion that even the nifty "identification grid" can not always solve the problem. The press work is uneven.

Happily there are exceptions. The illustrations on pages 273, 275 are splendid; pages 277, 279, 281 give outstanding, clear directions for budding rose bushes. No one following them carefully can fail to succeed in this ticklish undertaking.

Paragraphs at the bottom of text pages are to the point. To know when, where and how the plants reach our gardens gives keen satisfaction to the true gardener.

ANNE DORRANCE,
Dallas, Penna.

Vacation Flora

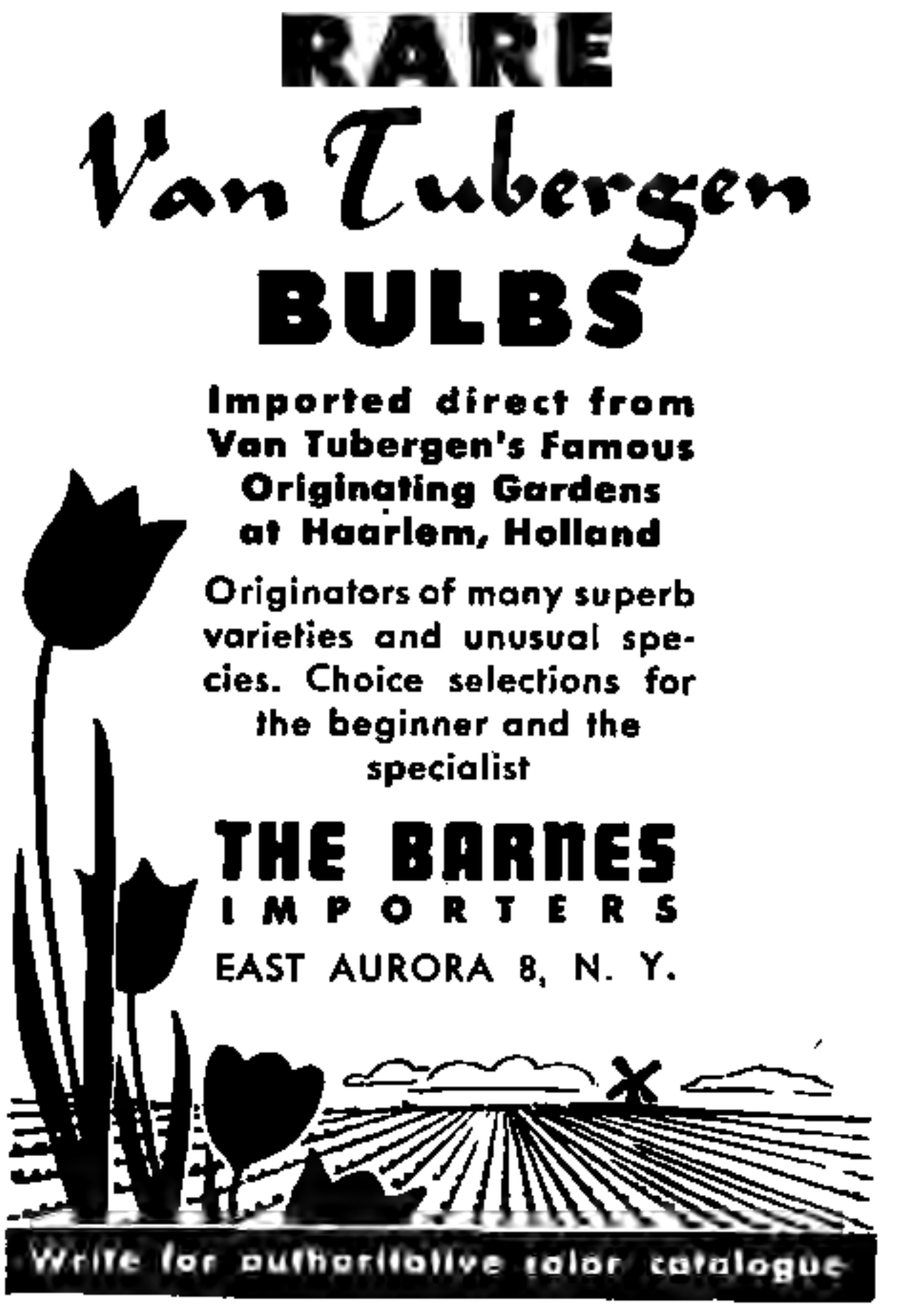
WOODY PLANTS OF THE WESTERN NATIONAL PARKS. Virginia Long Bailey & Harold Edwards Bailey. 274 pages, illustrations, index, bibliography. American Midland Naturalist Monograph #4. University Press, Notre Dame, Ind. 1949. $4.

This descriptive manual can be used successfully by anyone who has a desire to know the shrubs he sees about him in the western national parks, even if he has no more than a beginner's knowledge of botany. A short key to the trees is also included.

In the front there is roughly three-quarters of a page of narrative on each of the sixteen parks that are treated, describing for the vacationist their botanical appeal and to a limited extent other natural features. This sets the botanical scene well by telling what might be expected in each park at varying altitudes and terrain in sufficient detail both to stimulate and facilitate a more conclusive check in later pages.

The book will get results for the reader regardless of his knowledge of plant life. For example, there is a lot of mountain mahogany around Grand Canyon and Bryce National Parks that would surely catch the visitor's eye. Anticipating its presence from reading about it in the general description of the area, many a casual traveler might ask the Ranger to confirm it for him, and from there the index leads him to the technical

*H. E. Downer, James G. Esson, T. H. Everett and Paul F. Frese.



details. For those others who want the fun of being on their own, the book offers the accepted method of plant identification.

W. L. POULSON,
New York City.

By a Primrose Authority

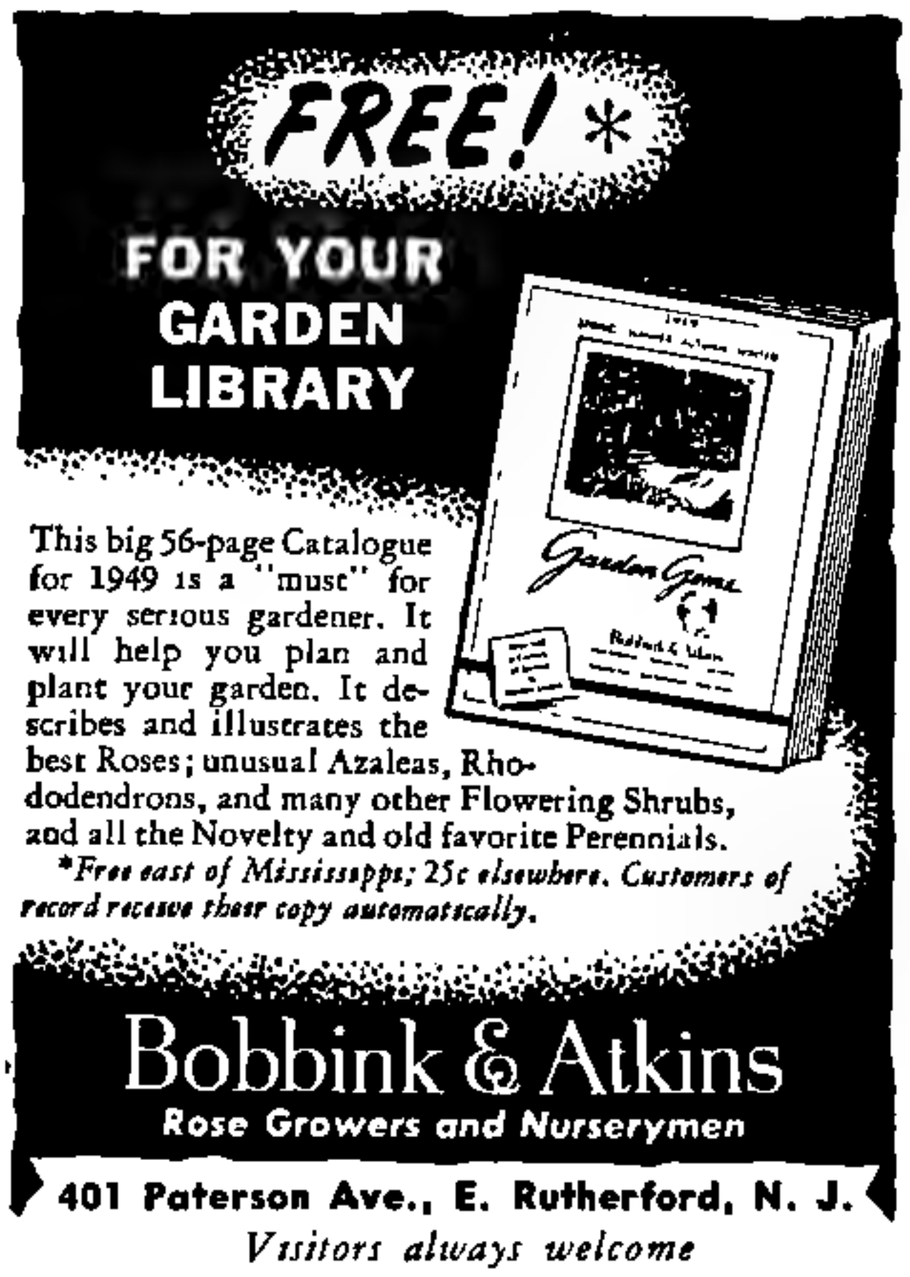
PRIMULAS IN THE GARDEN. Kenneth C. Corsar. 143 pages, illustrated, indexed. Macmillan, New York, 1949. $3.75.

Kenneth C. Corsar, noted for his work with the genus *Primula* and long identified with the Auricula Society in England, has contributed a valuable addition to horticultural literature with his recent book, "Primulas in the Garden." Based upon his own practical experience and on the notes he has accumulated through the years, the book treats the subject comprehensively and authoritatively. The numerous species are adequately described, their uses in the rock, wild, bog garden, border or alpine house are indicated, and their cultural likes and dislikes fully covered.

This is a book which every primrose enthusiast will want to possess. It is not only informative but well written and, therefore, a pleasure to read. Moreover, it is thoroughly and beautifully illustrated — in fact, I do not recall ever having seen finer close-ups of primulas, showing form of plant, details of flower and leaf.

It seems a pity to dampen praise of "Primulas in the Garden" by reminding American readers that England's climatic conditions are not ours — particularly along the eastern seaboard — and that they cannot hope to achieve success with all the intriguing species described, were they obtainable. If American gardeners heed this warning and temper their enthusiasm, they will enjoy and derive much benefit from Mr. Corsar's book. Having just finished reading it for review purposes, I now want to reread it and absorb the contents in a more leisurely manner.

DOROTHY EBEL HANSELL,
Summit, New Jersey.



Bacteriology for the Layman

MICROBES MILITANT: A CHALLENGE TO MAN. (A revision of **"The Microbe's Challenge"** of 1941) Frederick Eberson. 401 pages, illustrated, indexed. Ronald Press, New York, 1948. $4.50.

This is one of the Humanizing Science Series — a textbook on bacteriology for the layman. Dr. Eberson covers the course of bacteriology from the days of van Leeuwenhoek to the research problems of the present day. Such an ambitious project could have disastrous results, but fortunately the author has the happy faculty of presenting the more complex problems in present-day bacteriology in a very clear and entertaining manner. At the same time he avoids too much over-simplification, and the result is a popular yet authoritative book. Unfortunately he has not supplemented his writing with sufficient illustrations and the book suffers somewhat as a result.

ELIZABETH A. HALI

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THE CORPORATION OF THE NEW YORK BOTANICAL GARDEN

The New York Botanical Garden was incorporated by a special act of the Legislature of the State of New York in 1891. The Act of Incorporation provides, among other things, for a self-perpetuating body of incorporators, who meet annually to elect members of the Board of Managers. They also elect new members of their own body, the present roster of which is given below.

The Advisory Council consists of 12 or more women who are elected by the Board. By custom, they are also elected to the Corporation. Officers are Mrs. Thomas D. Thacher, Chairman; Mrs. Guthrie Shaw, First Vice-Chairman; Mrs. Charles Burlingham, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Philip B. Weld, Corresponding Secretary; and Mrs. Junius A. Richards, Treasurer.

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JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

AUGUST

1949

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GRADUATION

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GARDEN EVENTS

AND PERSONALITIES

PAGES 169—192

VOL. 50 NO. 596

NTS $1.50 A YEAR

MATILIJA POPPY

FROM A PAINTING BY SIDNEY ARMER

ON EXHIBIT THROUGH THE SUMMER

LOOKING FORWARD TO FALL

WHILE the vacation months are bringing many visitors each day to the New York Botanical Garden to enjoy the plantings of flowers, shrubs and trees, staff members of the Garden are preparing for the activities of autumn.

Courses to begin in September are listed below. Special rates are being offered this year to married couples.

Field Botany
Sept. 10 - Oct. 22, 1949
7 sessions on Saturdays, 1:30 - 3 p.m., totaling 15 credit hours of work
Fee $5; single trip $1
Instructor: *Mr. G. L. Wittrock*

Mushroom Identification
Sept. 17 - Oct. 22, 1949
6 sessions on Saturday mornings, 10:30 - 12
Fee—$5
Instructor: *Dr. Donald P. Rogers*

Nature Study for Teachers
Sept. 21, 1949 - Jan. 11, 1950
15 sessions on Wednesday afternoons, 4 - 6 p.m.
Fee—$10; to teachers, $5
Instructor: *Mr. G. L. Wittrock*

General Botany I
Sept. 26 - Dec. 12, 1949
12 sessions on Mondays, 8 - 9 p.m.
Fee—$10; to married couples, $17
Instructor: *Dr. H. W. Rickett*

Systematic Botany
Sept. 26 - Dec. 12, 1949
12 sessions on Mondays, 9 - 10 p.m.
Fee—$10; to married couples, $17
Instructor: *Dr. H. N. Moldenke*

Designing the Home Grounds
Sept. 28 - Nov. 16, 1949
8 sessions on Wednesdays, 8 - 10 p.m.
Fee—$15; to married couples, $25
Instructor: *Miss Alice L. Dustan*

Fundamentals of Gardening
Sept. 29 - Dec. 22, 1949
12 sessions on Thursdays, 8 - 9 p.m.
Fee—$10; to married couples, $17
Instructor: *Mr. T. H. Everett*

Plants of the Tropics
Sept. 29 - Dec. 8, 1949
6 sessions, on alternate Thursdays, 7:30 - 9 p.m.
Fee—$7.50
Instructor: *Mr. R. S. Couan*

Free Saturday programs will commence Oct. 1 at 3 p.m. with a showing of Walter E. Thwing's remarkable lapse-time photographs of the growth of plants.

The Cover Picture

PHOTOGRAPHED by Janet Armer, the illustration of the matilija poppy (*Romneya Coulteri*) on this month's cover is taken from a watercolor painting by Sidney Armer of Fortuna, California. This is one of sixteen of Mr. Armer's flower paintings on exhibit in the rotunda of the Garden's Museum Building during the summer months. Mr. Armer, who is a retired commercial artist, was awarded a silver medal by the Horticultural Society of New York when his paintings were exhibited there within the past year. Another group of selections from his work was on view last spring at the azalea festival in Brookings, Oregon. Several of his paintings are owned by western museums.

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THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 50 AUGUST 1949 NO. 596

Constanza—The Valley Beautiful

By H. A. Allard

MY happiest memories of the Dominican Republic, a land of magnificent scenery and delightful climate, center around the little mountain town of Constanza, in the beautiful Constanza Valley. In late October and early December of 1947 I made two trips into this region, which occupies the eastern and greater part of Hispaniola, with Haiti as its neighbor at the western end of the island.

Along the Duarte Highway

Constanza is 225 kilometers (135 miles) from Ciudad Trujillo (formerly Santo Domingo) on the south coast, and is now readily accessible by a good automobile road which passes through some of the finest agricultural country and most superb mountain scenery to be found anywhere in the world. One leaves the low monotonous coastal plain, which rests on coral rock formation, and follows the winding Duarte highway northward through the pretty little town of Villa Alta Gracia, 35 miles from Ciudad Trujillo, then Piedra Blanca on the picturesque Maimon River. The Goodrich rubber groves are near Piedra Blanca and a joint rubber planting program is being carried on by the United States and Dominican Departments of Agriculture. Forage crops and other plants likewise are being tested here. This rubber station is on the southern slope of the CORDILLERA CENTRAL, the great central chain of mountains which almost bisects the island of Hispaniola in an east-west direction. It is in this great mountain system that Constanza is located.

As we climb the ridge from the bridge over the Maimon at Piedra Blanca, 45 miles from Ciudad Trujillo — or 75 kilometers, according to the stone posts set up at every kilometer — we see for the first time the steep mountain slopes on the right covered with pine forest and grass, much like the open long-leaf pine districts of our own South. These

slopes mark the southernmost limit of the pine forests here, and, as we climb, the transformation from tropical broad-leaved evergreen forest to pine appears to be rather sharp.

But we have not yet left all tropical verdure behind us. Between Bonao (62 miles out), and La Vega in the fertile Cibao Valley, 20 miles farther on, are some of the finest natural groves of stately royal palms in the Dominican Republic.

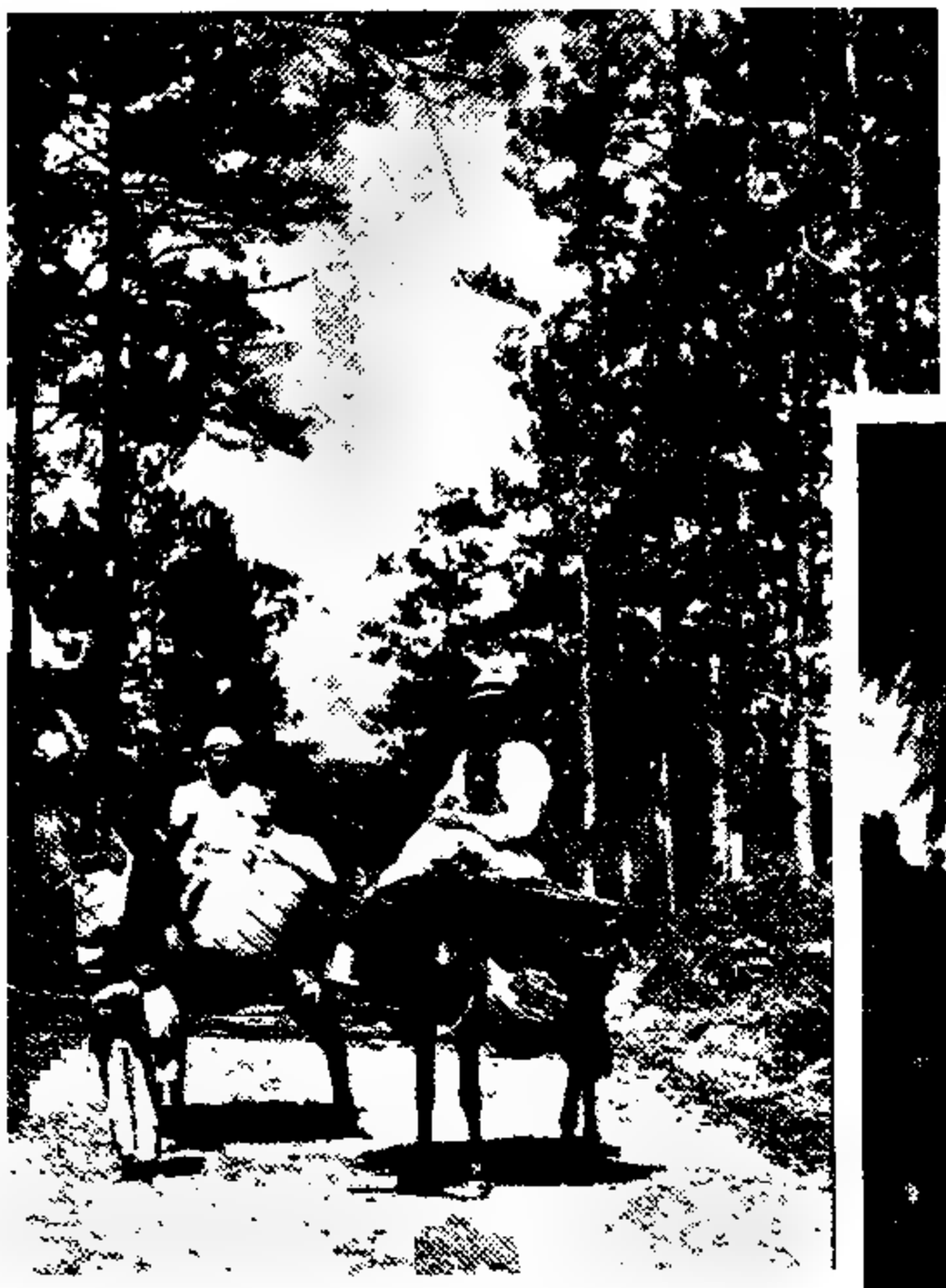
Two sharp left turns put us on a winding mountain road which climbs sharply toward Jarabacoa from the level floor of the valley. The magnificent pine forest, which we soon enter, continues practically all the way to Constanza, though in one section royal palms, hat palms and coconut palms intermingle, almost within the pine lands. A scenic winding highway through these pines carries us to Jarabacoa, then with another sharp left turn we climb rapidly to the beautiful Jimenoa Falls and Canyon at 2,500 feet altitude, aptly represented on a series of 13 Dominican postage stamps. The Jimenoa Canyon itself is a steep-sided, picturesque gash in the mountain-side, 1,000 feet deep, and a good trail leads down to the pool at the foot of the great vertical cliff where the Jimenoa River makes its final plunge into space. The highway itself is on the very edge of this canyon and from this vantage point one can look back and view the beautiful Jarabacoa valley with its rolling contours and its high peripheral mountain ridges.

From this point we continue to climb in a winding course, now following along narrow hog-back formations connecting passable ridges and spurs, now clinging to narrow rocky shelves bordering fearfully steep slopes. A dozen miles from Jarabacoa the altitude range approaches 3,650 feet. The temperature in the shade here was 69° F. We were now

SCENES ALONG ROAD APPROACHING CONSTANZA

(On the opposite page)

Upper left: The east slope of the Cordillera Central viewed from the Duarte highway in the Dominican Republic. Constanza lies far back of the high peak. A great tropical rain cloud is preparing to pour its rain upon the mountains here. *Upper right*: The MANACLA palm (*Euterpe globosa*) is a common and beautiful native palm in the rain forest of Hispaniola. A slender growing species, it may reach a height of 50 feet or more. This specimen was in a ravine at 4,000 feet between Jarabacoa and Constanza. *Lower left*: A Dominican family travels on burros over the steep mountain highway which leads through the great primeval pine forest from Valle Nuevo to Constanza. The little boy is carrying his tiny black pet pig in his arms. *Lower right*: In the high pine-covered mountains between Constanza and Valle Nuevo, at 5,000 feet, the trees are sometimes draped with a fruticose lichen, this one probably a species of *Usnea*.



Dr. Allard and the Length-of-Day Phenomenon

GROWERS of those plants whose vegetative development and date of flowering are influenced by the amount of daylight they receive owe their knowledge of this phenomenon to a pair of scientists from the U. S. Department of Agriculture — Doctors H. A. Allard and W. W. Garner. Their discovery of the controlling effect of light, first announced in 1920, proved that while some plants require the long summer days of far northern or far southern latitudes, others require shortened days of autumn for their flowering. Another large group is day-neutral, since these will flower under all lengths of day from the equator to the poles.

Few recent discoveries in plant life, it has been said, have been of such great fundamental importance in developing a better understanding of the various cyclic behaviors of plants and controlling them for practical ends. Such facts of plant life which were still revolutionary a quarter-century ago have today become common knowledge among growers.

In a collecting trip which he made for the Smithsonian Institution in the winter of 1945-46, and in another the next year, immediately after his retirement, Dr. Allard discovered that the Valley of Constanza in the Dominican Republic offered an ideal situation for the further pursuit of length-of-day research on plants, particularly as the amount of light received affects the development of food crops. He prefaces his observations, which will appear in a forthcoming Journal, with a description of this "Valley Beautiful" — which he found to be as desirable a spot for vacations as for scientific studies. — C.H.W.

actually in the clouds and shreds of white mist flew across our course or hung almost motionless over the deep valleys far below us. At 3,700 feet the distinctive mossy forest began to appear, and long, dangling, fruticose lichens, as well as mosses and epiphytic flowering plants became conspicuous elements upon the trees. Even at 3,600 feet we had noted bananas and PLATANOS (plantains) growing on the mountain slopes in spite of the coolness. At 3,300 feet, our familiar mullein, *Verbascum thapsus,* as it appeared, became an element of the temperate flora.

About 20 miles from Jarabacoa the scenery became extremely mountainous but unfailingly beautiful with an interblending of both tropical and temperate region features. Gigantic pine trees of the primitive forest were everywhere in evidence, while the more warmth-loving royal palms had now practically disappeared. In the deep valleys far below us the greenness and the thrifty appearance of the cultivated lands, as well as the neat little village communities, reminded me of certain aspects of the high Alleghenies of West Virginia. I did not seem far removed from similar scenic impressions which I had experienced on the highway from Davis in Tucker County to Lanesville and the Dolly Sods highlands, whose altitudes are also near 3,500 to 4,000 feet. The highest altitude reached on the highway to Constanza was 4,000 feet or a little more at a point about 22 miles from Jarabacoa.

Torrential rains sometimes occur in this mountain country, and the highway from Jarabacoa to Constanza then becomes impassable from slides of rock and soil. We saw evidence of this in several places on our trip.

A Temperate Climate in the Tropics

We soon began to descend to the valley of Constanza itself and arrived at the hotel Brisas del Valle at 5 p.m. As soon as I got a view of the yards and surrounding countryside here, I felt that I was in a country and climate but little related to conditions existing in the warm, humid, tropical lowlands of Ciudad Trujillo, which we had left at 10:30 a.m. Here at 3,500 feet, the altitude of the valley floor, was the genuine coolness of a true temperate climate. In the flora there were hosts of temperate region plants and flowers, some familiar, others strange to me. The genuinely tropical floral elements had dwindled to a very limited assortment of species, though there were still poinsettias and a huge white-flowered ornamental tropical *Datura*. Dahlias and roses in magnificent display were growing in every garden, and Heavenly Blue morning glories, petunias, zinnias, hollyhocks and many other familiar plants of our own northern gardens were thriving everywhere.

The night air became very damp and chilling, and clouds and brief showers swept over the mountains in the evening.

Primeval Pine Forest

Constanza is a most remarkable little town, containing perhaps 1,000 persons. Towering pine-clad mountain ridges with elevations of 4,000 to 5,000 feet or higher completely hem in the valley. At one point a highway leads out of the valley reaching an elevation near 6,000 feet at Valle Nuevo. Here, President Trujillo maintains a beautiful estate. We attempted to drive to this point but found the earth road so impassable with mud and washouts that we were forced to stop at 4,500 feet. This road, extremely steep and winding in places, affords some of the most spectacular mountain scenery and magnificent primeval pine forest I have ever beheld. Some of the trees had trunks 2½ to 3 feet in diameter and stood 100 feet high or higher. Various shrubs and herbs of temperate-climate affiliations, including species of *Rubus* (a high blackberry) formed the ground herbage.

This pine (*Pinus occidentalis*) is strictly indigenous to the island of Hispaniola, and has 3 to 5 long needles in a fascicle. In general appearance the tree resembles the long-leaf pine of our southern states, and has a very resinous heavy wood, almost sinking in water. It is the only pine on the island and occurs only in the great CORDILLERA CENTRAL. Every limb in this remarkable pine forest was so draped with festoons of greenish fruticose lichens and long, dangling skeins of Spanish

moss (*Tillandsia usneoides*) that it seemed almost unnatural, a sort of fairyland, rather than a mere pine forest in a tropical Caribbean island. Never have I been so thrilled and fascinated with the poetry of a forest as I was among these great primeval pines on the steep mountain slopes below Valle Nuevo. So sensitive were the long skeins of *Tillandsia* that the slightest stir of the winds caused them to become inclined and restless with an enhancing grace of sinuous, flowing movement. Even the pines themselves sang their characteristic tunes, for the winds are rarely quiet on these high mountain slopes, and it was the same soft, soughing music that one hears in the singing of pines the world over.

These forests are practically immersed in clouds much of the time, the even cloud line, which begins near 5,000 feet, indicating a rather constant zone of condensation to form the base of the massive cumulus billows. On several days during my collecting trips near the highway and just below Valle Nuevo, the afternoon cloud blanket usually formed a ceiling at a rather constant level. On one occasion it was suspended just above my head, so that I could actually extend my arm into the floating mist. It was an almost uncanny experience with the clouds, though I had been in a similar situation on the slopes of Cabin Mountain in West Virginia some years ago.

Setting for an Ideal Vacation Spot

Its altitude and its sheltered position in a deep mountain valley give Constanza a most enjoyable and invigorating temperate climate. The surrounding mountains capture much of the rainfall so that Constanza valley has a rather moderate precipitation, but the lower mean temperatures tend to prevent excessive evaporation. We speak of temperate zones in high latitudes north of the tropics, but the only true temperate climates occur at high altitudes in the tropics proper. Whereas in the temperate zones the summers provide intense heat and the winters have much of the character of the frigid zones, this is not true of a high valley like that of Constanza. Here the climate is uniformly cool and permanently temperate for every month of the year. The mean annual temperature at Constanza is near 64° F., in contrast to Ciudad Trujillo on the hot southern coast with 78° to 79° F.

During my first visit to Constanza, which was at the end of October, the temperature of my bedroom at 6 a.m. in the Hotel Brisas del Valle was 60° F., and the pitcher of water which had remained in my room all night was also 60°. In the winter, however, temperatures at Constanza may at times reach frost or freezing, though the season is generally mild. Many tender plants are then severely injured, and even the leaves on the trees may be blighted by the cold winds. But Constanza is in a

particularly healthful region since, within its relatively low range of temperatures, malaria and the malaria-carrying mosquitoes do not find favorable conditions for their existence, or for harboring the malarial parasites.

This is but one of the many reasons why Constanza would make an ideal vacation spot for any time of year. From both a scenic and climatic point of view, the valley and the mountain trip en route are unsurpassed for tourist enjoyment. With its cool and invigorating climate, in contrast to the lowland heat and humidity, the valley could easily become an alluring vacation land. An effort should be made to establish good moderate-rate hotels here or good tourist camps with accommodations for food and cooking if need be. The high mountains on every side would afford wonderful opportunities for out-of-door life afoot or on horseback.

The Dominican Government should also adopt a far-seeing policy of forest preservation, giving especial attention to the permanent preservation of areas of the great primeval pine forests to be found at present along the highway leading to Valle Nuevo. Such undisturbed natural forest preserves with their rare endemic flora here would prove a mecca for visiting botanists and naturalists in the future. I understand that President Trujillo has already forbidden lumbering in this area, and it is to be hoped that his interdict will maintain large areas of these glorious pine forests for the enjoyment of future generations of people.

Under a Trio of Shade Trees

By Frances R. Williams

THREE tall trees shade the southern side of my suburban lot in Winchester, Mass. Just over the boundary line a swamp white oak and a red maple stand, while a tall American elm has its roots on my own land. Evergreens were planted beside the adjacent driveway twenty years ago, and between these and the shade trees, more and more beds have been cut from the lawn to make space for plantain-lilies (*Hosta*). After a dozen years or more, some of these have become superb specimens. Ground covers and a few taller plants fill the spaces between, and the combination of the large leaves of the *Hosta* with the finer leaves of their companions makes a pleasant contrast.

THIS is the second of three articles by Mrs. Williams, describing the shaded gardens on her property in Massachusetts. The first article appeared in the Journal for July. At the conclusion of the series a list of the plants with which she has had success in the shade will be published.

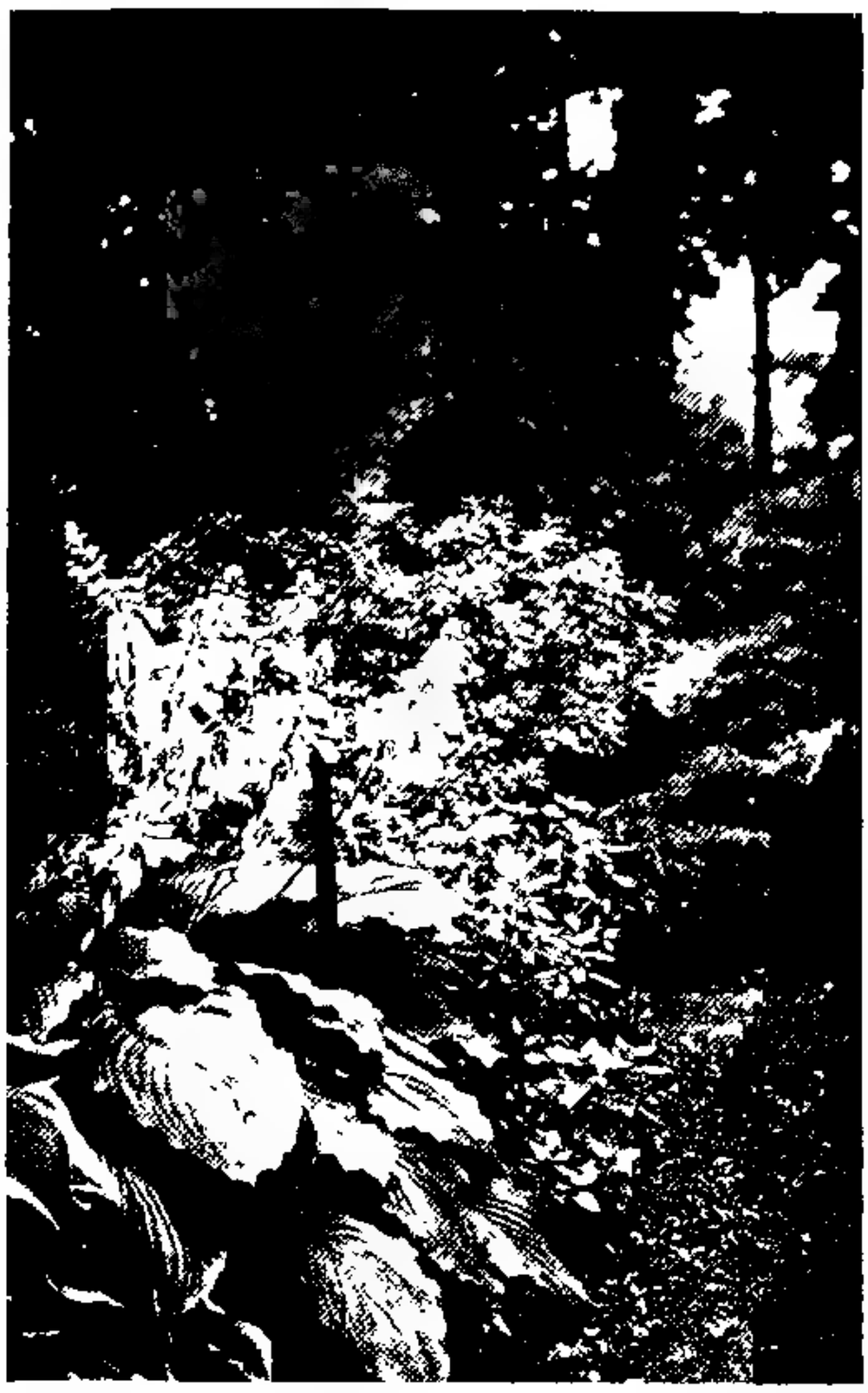
It does not take many of the large plantain-lilies to fill a flower bed. Among these creeps a green and gold myrtle, and feverfew seeds itself everywhere, its small yellow-green leaves and semi-double white flowers fitting in well. The narrow-leaved plantain-lily with the fine white line around its edges flanks the bed along the stepping stones of the path.

Quantities of spring bulbs fill the area. Several varieties of Spanish squill and glory-of-the-snow are gay in spring. *Ornithogalum nutans* has been added, and though the large silvery stars of the flowers are lovely, the bulbs are spreading until they threaten to crowd out the others.

Years ago, the front of my lot was a very small skating pond. The driveway follows the side of this area, along the foundation of an old roadway. Though my front land has been filled, there is still much dampness beneath. Between the entrance to the lot and the hemlock hedge which hides the driveway three specimens of Pfitzer juniper were planted 20 years ago. They have grown from 3 or 4 feet in diameter to 9 to 12 feet in extent, and two have had to be cut back. The six-foot flower beds in front of the junipers are little more than a foot deep, as roots of elm, hemlock and juniper are everywhere, but they have been made rich with generous quantities of compost and fertilizer.

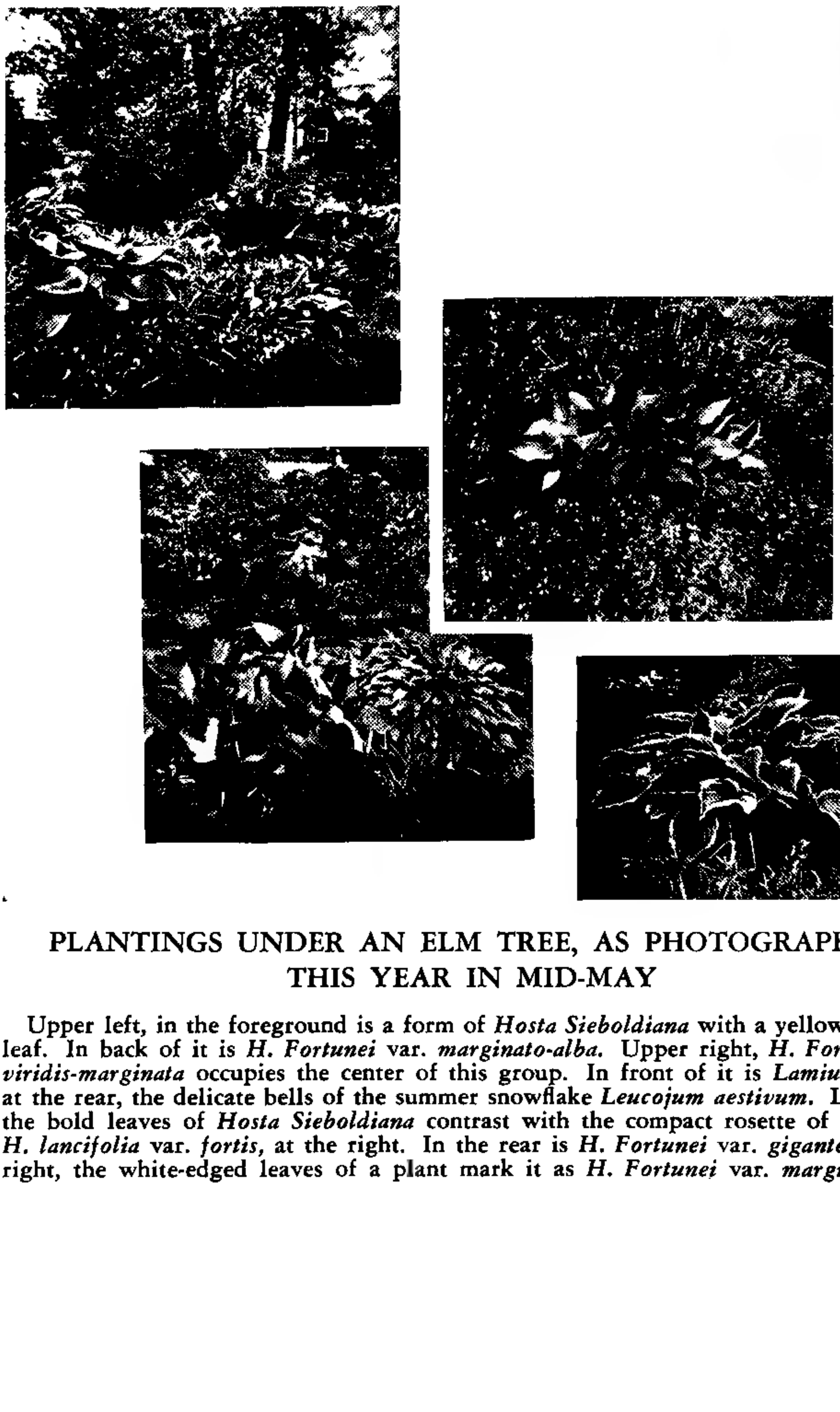
Against the easterly juniper next to the hedge, the contrasting foliage of a group of plantain-lilies makes a striking picture — beautiful mounds of gray and of white and green in varied tones and shadings on the large, heavy, overlapping leaves. White crocus from an old garden, a variety of very firm texture, and *Puschkinia scilloides* are the spring bulbs here. Lady-fern keeps appearing until what is not wanted has to be weeded out. A green and white gill-over-the-ground was planted in an open place where part of the juniper broke off along the drive, and is now climbing up into the juniper branches with an amusing effect.

The bed in front of the middle juniper has been twice enlarged to hold more varieties of *Hosta.* In the spring of 1948 there appeared a charming combination, quite unplanned. A lavender-flowered azalea, *Rhododendron yedoense* var. *poukhanense*, next to the juniper, was in full bloom and in front of this a large specimen of *Hosta Fortunei* var. *viridis-marginata* in its spring glory of large yellow leaves edged with green; the ground cover of white archangel was in flower, and snowflakes dangled their white flowers with touches of green all through this bed. Later in the season, the meadow anemone comes into bloom. Throughout the bed



Upper left, *Hosta Fortunei* var. *gigantea* as it appears in July when it is in full bloom. Below, *Hosta Sieboldiana* and other species planted adjacent to the junipers in Mrs. Williams' yard. Upper right, sweet woodruff (*Asperula odorata*) flowering abundantly beneath a tree at the rear of the house.

are yellow violets, and their seedlings keep increasing. A few winter aconite in early spring add interest, and plenty of crocus, scilla and grape-hyacinth make a bright show in their turn. In this same bed is the large plantain-lily, *Hosta Fortunei* var. *gigantea,* with a 6-foot spread, showing its tall spires of palest lavender flowers above the huge green leaves in early July. The flower bud of this species makes a fascinating rosette of pinkish bracts. Creeping buttercup is the ground cover beneath.



PLANTINGS UNDER AN ELM TREE, AS PHOTOGRAPHED THIS YEAR IN MID-MAY

Upper left, in the foreground is a form of *Hosta Sieboldiana* with a yellow-bordered leaf. In back of it is *H. Fortunei* var. *marginato-alba.* Upper right, *H. Fortunei* var. *viridis-marginata* occupies the center of this group. In front of it is *Lamium album;* at the rear, the delicate bells of the summer snowflake *Leucojum aestivum.* Lower left, the bold leaves of *Hosta Sieboldiana* contrast with the compact rosette of foliage of *H. lancifolia* var. *fortis,* at the right. In the rear is *H. Fortunei* var. *gigantea.* Lower right, the white-edged leaves of a plant mark it as *H. Fortunei* var. *marginato-alba.*

For late July bloom there is the tall-cluster plantain-lily, and in the fall a wild bluish-lavender aster (*Aster novi-belgii*), a Korean chrysanthemum, and a small sunflower, in addition to the bulb *Sternbergia lutea*. Mountain fringe, self-sown, climbs over the juniper when allowed.

The third juniper, nearest the street, has in front of it and extending beyond it into the lawn, a bed cut in 1948 to hold six *Hosta* plants of large species, placed nearly 6 feet apart to allow space for growth in soil heavily enriched. I did not realize 15 years ago when I started to add to my number of plantain-lilies that with care and heavy feeding they would grow into such magnificent plants. The ground covers under these are patches of Roman wormwood, which will grow weakly in shade, money-wort, myrtle, *Phlox stolonifera, Fragaria vesca, Sedum spurium, Sedum Ellacombianum,* a white violet with large flowers, wild ginger, bugle, the white dead-nettle, and two geraniums, *G. sanguincum* and its variety *prostratum* (the latter bought under the name of var. *lancastriense*). Often I have only a few of a kind, but enough to test the plant in its location. All are ground covers that grow in shade.

Guinea-hen tulips, the true jonquil (*Narcissus Jonquilla*), with clusters of bright yellow, sweet-scented flowers, camass, and bulbs of white puschkinia were planted in this new bed in the fall of 1948. (The last were especially lovely this spring.)

Two of the newly planted specimens of *Hosta* here will often get a sweep of wind. I did not realize this when I cut the bed. I am watching to see the results of the wind on those large beautiful leaves. It is not a situation to be desired, and I have mentally apologized to the plants.*

Along the drive toward the street is a bed 8 feet wide, now well shaded by a large cornelian cherry. This was a self-sown seedling and it is growing rapidly. Among the plants in this bed are some *Monarda* varieties, seedlings of *Brunnera macrophylla* (more often known as *Anchusa myosotidiflora*), sweet coltsfoot, self-heal, cobbler's bench (*Lamium maculatum* and its white variety), ribbon-grass, and orange mint. Bulbs include white crocus, several scillas that bloom with the early coltsfoot flowers, a couple of camassias, some grape-hyacinth and more snowflakes for spring. It is very much of a "take-care-of-itself" bed — as, in fact, are most of my beds. A couple of baneberries are being left here but I pull off the berries before they turn their gorgeous red. So many children go through my driveway, I am afraid of the poison of those attractive fruits.

Between the drive and the southern boundary is a strip 3 or 4 feet wide that likewise needs little care. The tall elm is in this strip, midway along, and with it is a collection of leftovers that have taken care of themselves and increased, such as a midsummer plantain-lily (*Hosta erromena*) and some common tawny daylilies. Then there is a row of hawthorn,

*However, they have stood up very well in the wind, and have grown beautifully.

with a long stretch of the double-flowered variegated daylilies beneath, the green and white leaves standing out at intervals from the other foliage. The bugles that I put here, *Ajuga reptans* and its variety *purpurea,* have spread through to the sunshine of my neighbor's lot, where, although regularly mowed with the grass, they make thriving, tight, neat mats of green and brownish green. The plant has also become self-located under a large corky euonymus and carpeted half of that area.

No especial fertilizer is used in this long strip beside the drive, but many leaves have purposely been left to rot there over the years, partly for their fertilizing value, but also to lessen garden labor.

Rose-Growers' Day . . . 1949

THE practical note was kept uppermost in the 1949 program for Rose-Growers' Day at the New York Botanical Garden. The occasion on June 9 was the seventh which has been arranged in co-operation with the American Rose Society.

After an hour's morning tour of the Rose Garden, with L. C. Bobbink, members of his staff, and other rose growers, both professional and amateur, inspecting new and old varieties and passing comments on their qualities, some 200 persons assembled in the Museum Building where the annual program of speakers took place.

Edward J. O'Keefe, who is superintendent of the estate of Mrs. M. Newborg in White Plains, where roses are a major feature of the grounds, opened with an informal talk on "Exhibiting Garden Roses," in which he gave advice on culture as well as on methods for successful display. Mr. O'Keefe has won a name for himself in a few years' time for his attractive exhibits of roses at the Horticultural Society of New York. He is one of the instructors in the Garden's Two-Year Course in Practical Gardening.

PROGRAM AND PERSONALITIES ON ROSE-GROWERS' DAY

(On the opposite page)

Above, L. C. Bobbink, patron of the rose garden, with his daughter, Mrs. George C. White, and Dr. P. P. Pirone, the Garden's Plant Pathologist. *Below,* on the platform at the conclusion of the morning program, left to right, W. E. Fleming, who talked on Japanese beetle control; Ann Hagan, with some of the arrangements she made with roses; Paul F. Frese, editor of *Flower Grower,* who presided, and Edward J. O'Keefe, who spoke on "Exhibiting Garden Roses."

PROGRAM AND PERSONALITIES ON
ROSE-GROWERS' DAY

Specific directions for the control of Japanese beetles in the rose garden, as presented by W. E. Fleming of the U. S. Department of Agriculture's Japanese beetle laboratory at Moorestown, N. J., will be published in a later number of this Journal.

ON THE AFTERNOON PROGRAM

***Left,* A. H. MacAndrews, who gave an appraisal of new rose varieties; *right,* Everett A. Piester, who conducted the symposium on rose culture.**

The morning program closed with a demonstration of the arrangement of roses in unusual containers, defying classical rules, by Ann Hagan, New York florist, who is a former student and employee at the New York Botanical Garden.

Paul F. Frese, Editor of *Flower Grower* magazine and, at the time when the annual Rose-Growers' Day was inaugurated in 1943, the Councillor for the second district (New York State) of the American Rose Society, presided during the morning session. In the afternoon he was succeeded by George A. Sweetser of Wellesley Hills, Mass., President of the Society.

"Choice Roses Among Recent Introductions" was the subject of Professor A. H. MacAndrews of Syracuse University, who is the present second

district Councillor of the American Rose Society. He illustrated his talk with kodachromes.

The concluding feature of the program was a symposium on rose culture, led by Everett A. Piester, Assistant Superintendent of Parks in Hartford, Conn., where he has direct charge of the famous rose garden in Elizabeth Park. Assisting him on the platform were Robert W. Eisenbrown of Bobbink & Atkins; Dr. P. P. Pirone, the Garden's Plant Pathologist; Paul F. Frese, George A. Sweetser, and Professor MacAndrews.

The Garden's tractor train, *The Floral Flyer,* stood ready to carry passengers back to the Rose Garden for a final view of some of the varieties under discussion, at the conclusion of the program. In all, about 250 attended during the day.

TWO NOTED ROSARIANS EXAMINING A CLIMBER

Left, Robert Pyle; *right,* George A. Sweetser, President of the American Rose Society.

Fifteen Certificates Granted in Two-Year Courses

Practical Gardening Course		*Science Course*
Hugh R. Berry	Harry K. Fudge	Joel V. Bolden
Rose Blum	Mary B. Himmelmann	Harry K. Fudge
Joel V. Bolden	René Schiffmann	Martin S. Learned
Edna S. Clarke	Gertrude Weller	Sylvia Stein
Madeline Dierks	Albert W. Wilson	
Florence England		

TWO students received certificates for successfully completing both of the Garden's two-year courses, the Science Course for Gardeners and the Course in Practical Gardening, this year. They are Dr. Joel V. Bolden, a physician who commutes between his office on 125th Street and his garden in Elmsford, N. Y., and Harry K. Fudge of Greenwich, Conn. The graduation took place the evening of June 23 in the Members' Room.

Eleven others were granted certificates, making a total of four in the science course and eleven in practical gardening. The entire roster of graduates is as given above.

Mr. Schiffman was awarded his certificate in the science course last year.

With families and friends of the graduates attending, also former students, instructors, and staff members of the Botanical Garden, about sixty persons heard the address on "The Challenge of Perfection" given by Mrs. Wirt Darrow, President of the Federated Garden Clubs of New York State. In the absence of Dr. William J. Robbins, who was on the West Coast, Dr. H. A. Gleason presided and presented the certificates. A social hour followed the program.

NOTICES AND REVIEWS OF RECENT BOOKS

Revised Garden Dictionary

TAYLOR'S ENCYCLOPEDIA OF GARDENING. Edited by Norman Taylor. Second edition, revised and enlarged, of **The Garden Dictionary.** 1,225 pages, illustrated. The American Garden Guild, Inc., and Houghton Mifflin Company, Boston. The Riverside Press, Cambridge. 1948. $5.

The average person requires of a reference book that it yield concise information quickly. Taylor's "Encyclopedia of Gardening" nicely fills this requirement for the gardener who includes one general garden reference work on his bookshelf. And many parts of the book, especially discussions of popular subjects like irises and roses, are useful to seasoned gardeners also.

Cultural operations are explained in sufficient detail to guide gardeners through many a pitfall, and plants are described in such non-technical language that even the rank beginner can understand without thumbing through his "Webster."

In many respects Taylor's present Encyclopedia and Seymour's "The New Garden Encyclopedia" (which came out in 1936 and has gone through several revisions and reprintings) are much alike. Each has an impressive list of contributors, whose initials lend authority to the more detailed discussions. Each has made a point of describing plants in language simple enough for the amateur to understand. And each gives practical help on what to grow where and how to get the best results, as well as sketching in some historical background to the timeless art and science of gardening.

For gardeners who mix their garden-

ing with traveling, an especially nice feature of Taylor's Encyclopedia is the horticultural summary, by states. Each describes commercial production and home garden interest within the state, as well as its climate and soil conditions. Seymour's has a more general discussion, by sections of the country.

Other valuable features of Taylor's are garden tables and a monthly garden calendar which takes up a dozen pages of the book. The latter was a feature of "The Garden Dictionary," of which this Encyclopedia is a "revised and expanded work," according to the blurb on the paper cover.

This reviewer believes that for a rank beginner at least — in some other respects Seymour's is slightly more satisfactory as a reference book. It gives a very brief discussion of each plant under its common name, and a longer one under its Latin name; Taylor's, in most cases, gives a cross-reference only under the common name. (But occasionally both books give main descriptions under the common rather than under the scientific name. For instance, "Daylily", rather than "Hemerocallis" carries the main discussion of this popular plant. It would seem to be more logical to follow the same style throughout the books.) Seymour's tends to give details of plant culture under break-downs of the subject, while Taylor's gives them under general headings. For example, in Seymour's bordeaux mixture is described in detail under "Bordeaux," while it is mainly described under "Fungicide" and a couple of other general headings in Taylor's. Photographs in Seymour's give a slight edge over Taylor's, which has none except for a frontispiece in color; both have many and excellent line cuts. Seymour's has larger type on heavier paper.

In the long run, however, either book will be found of easy reference and exceptional value to both new and experienced gardeners.

ALICE L. DUSTAN,
Morristown, N. J.

Hawaiian Book $8

Marie C. Neal's 805-page volume, "In Gardens of Hawaii," which was reviewed in the Journal for June, is priced at $8, not $10, as was erroneously announced in the headnote to the review.

Happy Daze

FLIGHT FROM REALITY. Norman Taylor. 237 pages, indexed. Duell, Sloane & Pearce, New York. 1949. $3.50.

It may seem a far cry from the drinking of an extract of a narcotic derived from a certain mushroom which has been purified by passage through the kidneys, as practised by the Koryak and other tribesmen of Siberia, to our own pleasant habit of a cup of coffee with breakfast, from the smoking of an extract from a poppy by an Oriental to our own use of cigarettes, or from the nibbling on a sweetmeat with its resinous ganja extract in a Bagdad bazaar to the munching of a chocolate bar by a subway rider in this Bagdad on the Hudson. Yet, basically, these practices have much in common, for in each instance the participant, consciously or not, is trying to "get away from it all."

There is scarce a single group of mankind that has not discovered some plant or plant product easily at hand which permits the partaker to escape from the humdrum realities of his often barren existence. Some of these are ultimately harmful if indulged in too frequently or long; others yield merely a transitory pleasant reaction with no known permanent effect. Taken together, they form a group of compounds which are of interest to the layman as well as the person professionally concerned with the basic psychology of that most curious of all mammals — man.

To this account of man's discovery and use of stimulant, narcotic, ritualistic, and euphoric drugs, Norman Taylor has brought his urbanity and wit, thus making absorbing reading of what, in less facile hands, might easily have been pedestrian and dull. It is evident throughout that the author is not crusading, but stays at all times within the bounds of sound ethnology, exact botany, and the medical findings on the effects of these various drugs. As a result, it may be a slight shock to some to learn that according to the reports of medical groups of the U. S. Army and also of a group of the New York Academy of Medicine appointed by the late Mayor La Guardia to study the question, the smoking of marihuana (reefers) produces no general result which would seem to warrant the present stringent and punitive laws regarding its posses-

sion or use. Obviously, the use of marihuana by minors should not be permitted, just as they are forbidden by law to purchase tobacco or alcohol, or to operate motor cars until they have reached an age of a supposed sense of responsibility.

On the other points, such as the sordid history of opium and its derivatives, the text is equally outspoken — and rightly so. The author has the detached and judicial viewpoint of the scientific investigator desiring only to ascertain and present the facts. Along with this, many additional items are brought into the work; for example, the history of tea as a cultivated plant and an article of trade, the various ways in which it has been taken as a beverage throughout recorded history, and how the various kinds of tea are processed.

"Flight From Reality" is the most accessible place for reliable information on the psychological reactions caused by the many drugs which man uses for his euphoric pleasure, something of their systemic after-effects, if serious, their botanical sources, and history. Besides, it is interesting and often exciting reading. No more could be asked by the reader desiring both entertainment and instruction.

W. H. CAMP.

Maintaining a Healthy Landscape

THE EARTH'S FACE AND HUMAN DESTINY. Ehrenfried Pfeiffer. 183 pages, illustrations, bibliography, index. Rodale Press, Emmaus, Pa. 1947. $2.75.

This book on the use of land is treated from an unusual point of view, general in scope and often philosophical in nature, portraying the subject in very broad strokes of the brush. The work is aimed at gaining interest of people who "want to take part in the shaping and forming of the natural and cultivated landscape in order to create a suitable environment for human beings everywhere." At times the author is abstruse and difficult to understand, but one cannot doubt his sincerity of purpose. The book concludes with several chapters on biological ideas obligatory for the maintenance of a "healthy" landscape, and man's responsibility for using proper techniques in handling it.

WILLIAM R. VAN DERSAL,
Portland, Oregon.

Agricultural Reprint

FARMERS OF FORTY CENTURIES, or Permanent Agriculture in China, Korea, and Japan. F. H. King. 379 pages, illustrated, indexed. Organic Gardening Press, Emmaus, Pa. Undated $5.

This is a reprint of an agricultural classic first published in 1911. It is a study of agricultural practice in Japan, China, and Korea, based on observations made by the author during a tour of those countries.

There is clearly set forth the means by which soil fertility is maintained in a highly populated area where the land is under almost incredibly intensive use. Though now somewhat out of date, the book is of lasting value to agricultural students, and is still filled with lessons useful in America. The publisher, however, should be severely censured for not indicating that the book is a reprint of a volume nearly four decades old.

WILLIAM R. VAN DERSAL,
Portland, Oregon.

Life and Structure of Insects

A GENERAL TEXTBOOK OF ENTOMOLOGY. A. D. Imms. 727 pages, illustrated, indexed. E. P. Dutton, New York. 7th Ed. Revised 1948. $12.50.

Entomologists and students of entomology will welcome the seventh edition (since 1925) of this book. Anatomy, physiology and embryology of insects from all parts of the world are covered clearly and in detail. The more than 600 illustrations greatly enhance the usefulness of the book.

P. P. PIRONE.

Woods of the World

ENCYCLOPEDIA OF WORLD TIMBERS. F. H. Titmuss. 156 pages, indexed. Philosophical Library, New York, 1949. $4.75.

The effort of the author of "A Concise Encyclopedia of World Timbers" to edit an encyclopedia to nearly two hundred of the more important commercial woods of the world is most commendable. However, many obvious deficiencies nullify the book's encyclopedic value.

The most objectionable shortcoming is from the standpoint of botanical nomenclature. The use of *Larix americana* interchangeably with *Larix laricina* to

identify the native tamarack of North America is quite confusing. Equally disconcerting is the scientific name of *Abies excelsa* for Norway spruce which was reclassified many years ago and placed in the genus *Picea* and is now termed *P. abies.* Many other similar errors and inconsistencies detract materially from the book.

Another nomenclatural criticism is the non-conformance to terminology used in describing woods as recommended by the International Association of Wood Anatomists.

A significant fact in judging the book's usefulness in reference work is that the descriptions of many of the woods are too brief and incomplete to be used as aids in positive identification of a wood. Supplementary references in these instances are often lacking.

The bibliography, although quite extensive, omits many of the excellent publications of the past decade.

It is unfortunate that a book with such a worthy objective should fall so far short of its goal.

DAVID P. THOMAS,
New York State College of Forestry at Syracuse.

Southwestern Florida's History

THE MANGROVE COAST. Karl A. Bickel. 210 pages, indexed. Coward-McCann, New York, 1942. $3.

Here is a regional study, written in the tradition of the annalist, the chronicler, and the newspaper reporter, with no evidence of editorial censorship of geologist, botanist or zoologist, and with no illustrations to enliven the undifferentiated facts and fancies. The spotlight is placed upon Tampa Bay and Charlotte Harbor with its modern cities of Tampa, Bradenton, Sarasota and Fort Myers, while occasionally the light is flung toward Pensacola, Tallahassee, St. Augustine and Key West.

As a regional name, the "mangrove coast" is perhaps not fortunate, for it is neither coincident with the entire Floridan mangroves, which extend around beyond Miami, nor with the greatest of the mangroves in the Shark River region. When the reader gets beyond the first chapter, with its interesting geologic and biologic misinformation, he finds a very readable account of Spanish days, with pirates, adventurers, hijackers and privateers, who ruled, ravaged, raped and ruined in this land. Then come the Seminole wars, the days after the collapse of the Confederacy, and the mushrooming of the modern cities. The book ends with chapters appearing to report on single excursions or interviews: a boat trip through the deep mangroves, game fishing, moonshining all replete with snake and crocodile stories and other lore.

WARREN G. KENFIELD.

Plants for Lasting Effects With a Minimum of Labor

RIGHT OF WAY MAINTENANCE BY PLANT-COMMUNITY MANAGEMENT. Frank E. Egler. 19 pages, illustrated. Published by Aton Forest, Norfolk, Conn., 1949., Obtainable from Conn. Tree Protective Assn., 764 Waterville St., Waterbury 84, Conn. 30c.

This booklet presents a theory regarding the maintenance of vegetated areas by the culture of a natural plant association. The author approaches the subject by first considering vegetation in North America according to generalized zones of temperature and then according to local controlling factors within these zones. Plant communities are traced in their progressive stages from bare soil to stable forest covers as they have evolved through natural causes and as they have been influenced by man. One plant association is then selected. It is an herb and shrub community comprising a cover type of low growth and lasting qualities.

The author has managed such a plant community successfully for a period of eight years on his own property at Aton Forest, Norfolk, Conn., and he points to the value of his principles when applied similarly to the care of right of way areas and other non-use lands such as those existing on certain highway roadsides and on commercial and industrial properties. For private estates and parkways his practices also have extensive horticultural applications which might be advantageously heeded.

The principle is essentially a recognition of one phase in a natural progression of vegetative growth; then by selective management under the direction of

a botanist, and by low-cost methods, using modern herbicides, to hold that phase in *status quo* for an appreciable length of time and obviate the usual costs of mowing and brush cutting. Although this principle has undoubtedly been practiced to a limited extent by others, this presentation with its well defined reasons and procedures should extend its usefulness generally.

NELSON M. WELLS,
Principal Landscape Engineer,
New York State
Dept. of Public Works.

Cell Physiology

BACTERIAL METABOLISM. Marjory Stephenson. 398 pages, diagrams, bibliography, index. Longmans, Green & Co. New York. 3rd edition, 1949. $7.50.

Today the lesson is clear that many processes in the green plant — for example, photosynthesis and nitrogen metabolism — can be understood only in the light of comparison with similar processes in microorganisms. Dr. Stephenson's masterly survey of the principles of cell physiology — as exemplified in microorganisms — provides the botanist with the ready means for selecting from the vast literature of microbiology the ideas and information of help in studying physiological processes in higher plants.

S. H. HUTNER,
Haskins Laboratories.

Foundation for Plant Growth

GARDEN SOILS. Arthur B. Beaumont. 280 pages, illustrations, glossary, index. Orange Judd, New York, 1948. $3.50.

This book by an enthusiastic amateur gardener and former professor of soils is recommended to all who garden. The practical information needed for intelligent utilization of whatever soil is available for a garden can be found here. The author is a firm believer in the efficacy of composts and of mineral fertilizer and thus avoids the absurdities of the "organic gardeners." The only way to appreciate the value of this book is to get a copy and then use it.

F. W. KAVANAGH.

Two Texts for Pharmacists

TEXTBOOK OF PHARMACOGNOSY. Heber W. Youngken. 1063 pages, illustrated with photographs and drawings, indexed. Blakiston, Philadelphia. 6th edition, 1948. $8.50

In Youngken's textbook, we have the best known American work on pharmacognosy, the science of crude drugs. The text shows many advances over the first edition of 1921 and those which have followed. It is the most up-to-date work in this field.

Numerous changes in text from the last edition were necessitated by the many discoveries and developments in the field covered, and by the consequent new editions of the U.S. Pharmacopoeia and the National Formulary. Many new drugs have been incorporated, a new chapter on the antibiotics has been introduced, a new section on pollen grains is presented, and the text has been considerably lightened by the deletion of such technical data as histology, microscopy, etc., for some of the less important crude drugs.

Although Youngken's book has been quite thoroughly revised, the text has not been entirely reset; consequently, paragraphs of new type frequently alternate with paragraphs evidencing by their rather ragged type-face a re-use from the last printing. However, for other than a bibliophile, this is not a serious matter, and, on the whole, the book shows novelty and attractiveness.

A valuable feature of the new edition is the presentation of several of the newer microanalytical methods so useful in the study of plant materials, such as vein islet counts and palisade ratios.

PHARMACOGNOSY. Edmund G. Gathercoal & Elmer H. Wirth. 756 pages, illustrated with photographs and drawings, indexed. Lea & Febiger, Philadelphia. 2nd edition, 1947. $10.

In contrast with the preceding work, in which the botanical viewpoint is stressed (especially morphology and histology), that of Gathercoal & Wirth is much more concerned with the chemistry of the various crude drugs. This text differs considerably from the earlier edition which was based on the third edition of Henry Kraemer's "Pharmacognosy." In the new edition, which is shorter than the first, much data on the less important products has been deleted

in whole or in part at the same time that several new items have been added to the text. Efforts were made to reduce duplication of information in the U.S. Pharmacopoeia and National Formulary.

The new edition contains sections on the chemistry of plant constituents, in which the various groups of compounds are taken up in connection with plant families where they are most abundantly and characteristically distributed, such as the alkaloids under Rubiaceae and volatile oils under Labiatae. As in Youngken's book, the drugs are treated in taxonomic order.

Sections relating to plant cultivation, storage, infestation, commerce, and when and where each drug is or was official in this country are valuable elements.

Though the text is attractive, printer's errors are quite numerous; but no doubt most of these will be corrected in succeeding printings. On the whole, Gathercoal & Wirth's text is excellent both for the student in pharmacy and for the interested lay person.

GEORGE M. HOCKING,
University of New Mexico.

An Oriental Art at its Source

MANUAL OF JAPANESE FLOWER ARRANGEMENT. Josui Oshikawa and Hazel H. Gorham. 322 pages, glossary, illustrations in color. Charles E. Tuttle Co., Rutland, Vt. 1947. $6.

Eighty-four pages of interesting description of Japanese life are calculated to attract the attention of a beginner in the study of a fascinating art. Numerous well executed sketches and diagrams, together with fifty-four illustrations in color, leave little to be desired.

Methods of shaping, placing and fastening branches and flower stalks in vases and basins are clearly set forth. Techniques requiring considerable care —for example, those used in arranging iris and narcissus by masters of the original Rokkaku-do Ikenobo school — are very properly omitted in a manual designed for the use of beginners. Originally published in Tokyo in 1936 with a buckram binding, the book is now being distributed with a heavier binding by an American publisher.

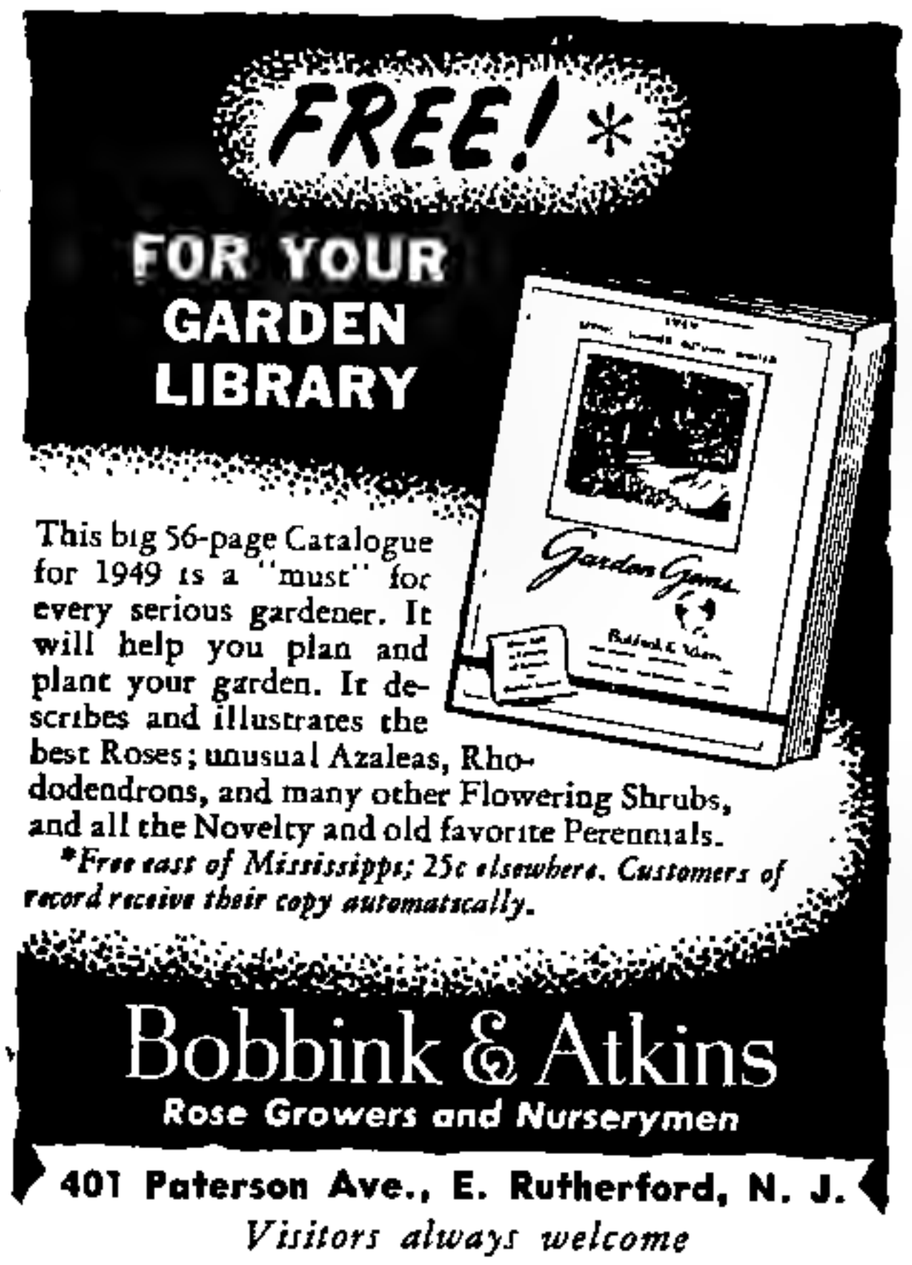
ERVIN S. FERRY.

For Student and Grower

SMALL FRUIT CULTURE. James Sheldon Shoemaker. 433 pages, illustrated, indexed. Blakiston, Philadelphia. 2nd edition, 1948. $4.

This book is a comprehensive revision of the earlier text first published in 1934. The previous division of the field has been retained with a separate section devoted to grapes, strawberries, brambles, currants and gooseberries, cranberries, and blueberries. This arrangement results in some repetition and where a laboratory is given with its use as a text, field exercises falling in seasonal sequence often cannot be preceded by theory. On the other hand, this arrangement enhances its value as a ready reference for the commercial grower. Within sections the material presented is susceptible to improvements from the standpoint of logical sequence.

The entire text has been rewritten. Many new illustrations with much additional information and many new references to source data in the literature are included. In general, it represents one of the best efforts of revision which has



occurred in the field of horticultural textbooks for many years, and it will continue to be widely accepted both for classroom use and as a reliable and practical guide for the commercial grower.

I. C. HAUT,
University of Maryland.

Flowering Trees

RHODODENDRONS, AZALEAS, MAGNOLIAS, CAMELLIAS AND ORNAMENTAL CHERRIES. A. T. Johnson. Notes on propagation by F. D. Puddle, 93 pages, illustrated. My Garden, London, W.C.2, England. 1948. $2.

This is a delightful little volume of essays on the several plants indicated by the title. There are thirteen good full-page illustrations of the flowers and plants discussed. It is surprising how much information has been compressed into a small space. It is informative, up-to-date and delightfully written. For those interested in the plants described within its covers, it will prove to be a very interesting volume and I am pleased to recommend it.

H. HAROLD HUME,
University of Florida.

Whims from a Garden Writer's Pen

GARDEN FACTS AND FANCIES. Alfred Carl Hottes. 370 pages, illustrated, indexed. Dodd, Mead, New York, 1949. $4.

Gems from the poets stand side by side with bits of botany; legends and old wive's tales share honors with pages on the history of garden plants, and inspirational essays by a great number of authors are interspersed throughout this book. These gleanings by one of the most prolific of America's garden writers include also amusing quips, games and quizzes, and short-short stories, as well as the author's own observations on many aspects of plant life and gardening. Great care has been taken that every quotation be properly credited to its author. Mr. Hottes' own black and white illustrations have a delicate and appealing quality, and the book is nicely printed on paper that it is a pleasure to touch — as should be in a book which is meant for random perusing.

CAROL H. WOODWARD.

Notes, News, and Comment

Television and Radio. Appearing on various television programs recently have been Dr. Harold N. Moldenke, interviewed June 29 on plants of the Bible, and G. L. Wittrock on poison ivy, poisonous plants in the woods, edible weeds, and the effects of the drought, on four separate programs. Earlier, Dr. P. P. Pirone spoke on insects in the garden and E. J. Alexander on Mexican plants. The majority of these were Dumont shows with Irene Murphy as the interviewer.

Dr. Moldenke spoke on plants of the vicinity of New York over WCBS July 22 on the program "This is New York."

Lectures. Dr. P. P. Pirone addressed the South County Garden Club in Rhode Island June 15 on "Pests and Diseases of Flower Gardens." Lectures which he has been scheduled to give to Affiliated Garden Clubs during the summer include the Rye Garden Club June 7, Greenwich July 19, Pawling July 21, and Fairfield July 26.

Denison University at Granville, Ohio, heard an address on "Plants and Human Affairs" by Dr. William J. Robbins June 1.

Traveling to the West Coast in June, Dr. William J. Robbins addressed the 30th annual meeting of the Pacific division of the American Association for the Advancement of Science at the University of British Columbia in Vancouver. His talk, which was given before the general assembly the evening of June 16, was entitled "Growth, Normal and Abnormal."

Staff Conference. Dr. F. R. Fosberg, who was the New York Botanical Garden's official representative at the Seventh Pacific Science Congress in New Zealand last February, came to New York from Washington on May 27 to give a report on the meeting. He illustrated the talk with his own kodachromes showing characteristic scenery and plant life.

Prize Contest. Announcement of the annual A. Cressy Morrison prize contest has been received from the New York Academy of Sciences. Two prizes of $200 each will be awarded for the most acceptable papers in a field of science covered by the Academy or one of its

Wayside Gardens

UMBELLATUM TIGRINUM *Fireflame*

EXCITING NEWS AT WAYSIDE THIS FALL

Exciting indeed is the colorful new catalog that brings to you the world's wealth of rare, fine quality bulbs, roots and plants for which Wayside is so justly famous. This year, the new introductions are exciting and beautiful beyond description. The lilies and pink daffodils listed below are but two of many outstanding items.

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Most gardeners delight in planting new and different flowers The extraordinary new Black Parrot Tulip is a real collector's item to satisfy the most enthusiastic seeker of the unusual Its artistic form and rare color make it superb in arrangements. Plant a clump among your brighter tulips.

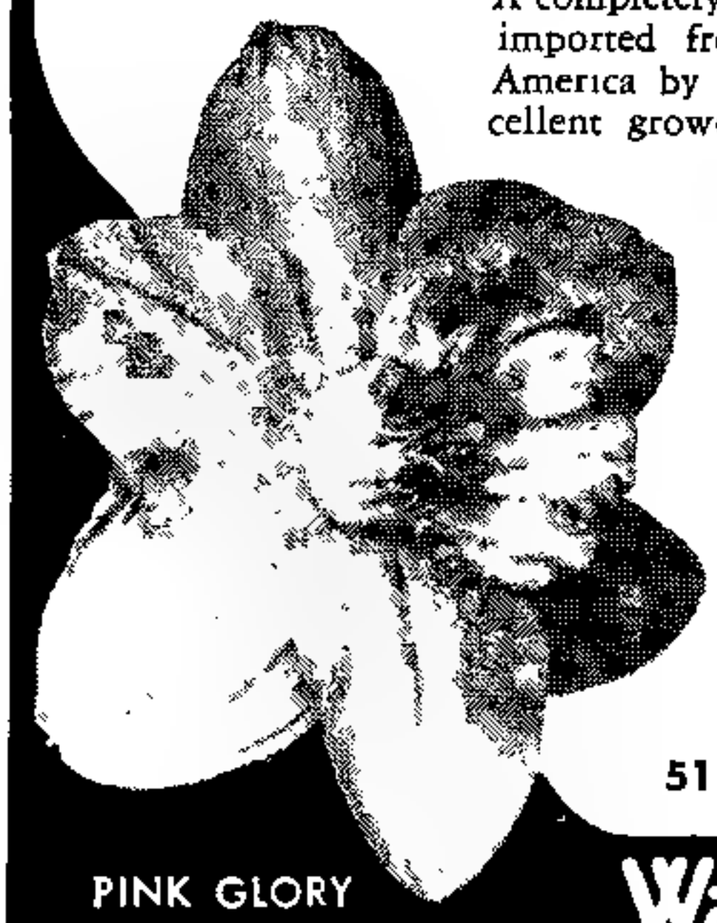
New Daffodils

JOHN EVELYN HYBRIDS

The finest daffodils ever introduced. Enormous flowers of breathtaking beauty and amazing stamina bloom freely, unaffected by the elements. The heavy substance petals are pure white or ivory with deeply ruffled and widely flaring cups of soft canary yellow to deep golden yellow.

Exciting New PINK DAFFODILS

A completely new strain of lovely pink and apricot tinted daffodils imported from Holland and introduced for the first time in America by Wayside Gardens. These delightful daffodils are excellent growers and multiply with surprising rapidity. Delicate colors are charming in the garden and for flower arrangements.



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51 MENTOR AVE. MENTOR, OHIO

Wayside Gardens

affiliated societies. Papers must be submitted to the Academy on or before Oct. 15.

Library Group. Elizabeth C. Hall was one of the speakers at an evening meeting of the library assistants' class of the Special Libraries Association, which took place at the Garden June 20. Florence Bradley, retired librarian of the Metropolitan Life Insurance Co., is the instructor in the course, which is being attended by Elizabeth Ann McConnell, assistant in the Garden's library. Mrs. Helen M. Fox, who was guest of honor, told the group of how she uses special libraries, particularly in doing research for such a book as her recently published translation of Abbé David's Diary. Esther Johnson, chief of circulation of the New York Public Library, spoke on book selection. The group was joined by 12 gardeners, who had been on an early evening field trip under the direction of T. H. Everett and E. J. Alexander, and Mr. Everett spoke on the apprentice system in gardening and library work.

Research Meeting. Dr. William J. Robbins attended a meeting of the Committee on Research of the American Philosophical Society in Philadelphia June 3.

Gift of Membership. An annual membership in the New York Botanical Garden, beginning July 1, has been presented as a gift to each of his 355 employees in New York by Colonel Robert H. Montgomery, a member of the Board of Managers.

Visitors. Mrs. Elly Sorger-Domenigg of Graz, Austria, spent the day at the Garden July 5, talking with staff members and making herself acquainted with plants and styles of planting here, in the interest of her own garden, which is one of the largest in southern Austria. Mrs. Sorger also is an amateur mycologist, whose war work consisted in part of identifying, for the entire populace, mushrooms picked from the wild as a supplement to the diet during the many meatless months. She also instructed women in the drying of mushrooms, among them some native species with alliaceous flavors which could be used as condiments.

Dr. A. G. Vestal of the University of Illinois spent a week at the Garden in early July with Mrs. Vestal working on ecological problems.

Dr. M. A. Johnson of Rutgers came to the Garden June 28 with Sam Shushan, one of his graduate students.

Mrs. Inez M. Haring of Poughkeepsie spent a few days working on the Garden's moss collection in mid-June. She was leaving shortly after for an extended collecting trip in the Southwest.

Dr. Clyde Chandler of the Boyce Thompson Institute has been investigating problems in forest genetics in the library.

Among others who have been at the Garden during the early part of the summer are P. C. Joshi of East Panjab University, India; Lewis S. Rose, California Academy of Sciences; J. G. Churchman, Anglo-Dutch Plantations, Java; E. D. Merrill, Jamaica Plain, Mass.; Anna E. Jenkins, Bureau of Plant Industry, Washington; Babette I. Brown, University of Rochester; Paul C. Lemon, New York State College for Teachers, Albany; Christabel Beck, member of the Lily Committee of the Royal Horticultural Society in England; P. B. Phillips, University of Alabama; D. J. Esson and R. H. Schott of Great Neck, N. Y., who visited the laboratories; Norman Taylor, New York City, author of the recently published "Flight from Reality" (reviewed in the Journal this month); Vladimir C. Asmous, Harvard College Library; José R. Velasco, College of Agriculture, University ot Philippines; Th. Voezelius, University of Helsinki, Finland; Marco A. Tio, Agricultural Experiment Station, Río Piedras, Puerto Rico; and Hugh M. Curran of the Forest Station at Caracas, Venezuela.

Medal. The Clarke Memorial Meda for 1949 has been awarded by the Roya Society of New South Wales to the Rev H. M. R. Rupp for his contributions tc the knowledge of Australian orchids. Mr Rupp is the author of "Something Abou Australian Orchids" which appeared ir the Journal of the New York Botanica Garden in July 1946. An honorary member of the staff of the New South Wales National Herbarium, he has published a number of technical works on the orchids of the region.

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JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

SEPTEMBER

1949

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BLUE ATLAS CEDAR AND A DWARF FORM OF
NORWAY SPRUCE IN THE MONTGOMERY
CONIFER COLLECTION

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3 p.m. in the Lecture Hall

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Oct. 8 ***It's Time to Plant Bulbs!*** — *Frank C. MacKeever*, Custodian of the Herbarium

Oct. 15 ***The World of Plants*** — *Richard A. Howard*, Harvard University

Oct. 22 ***Shrubs to Enhance the Flower Garden*** — *Henry E. Downer*, Vassar College

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Sept. 21, 1949 - Jan. 11, 1950

General Botany I
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Announcements of ***Members' Day programs*** for the autumn will be mailed to members of the Garden this month.

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JOURNAL
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THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 50 SEPTEMBER 1949 NO. 597

Varieties of Conifers—I

The Significance of a Comprehensive Collection and Some of the Problems of Maintenance and Culture

By Henry Teuscher
Curator, Montreal Botanical Garden

(*This is the first section of the address given at the dedication of the Montgomery Conifer Collection at the New York Botanical Garden May 26, 1949.*)

WHENEVER plants are gathered together for study in a botanical garden or arboretum it is of extreme importance to keep records of their origin, since many peculiarities of their behavior may thus be traced and an explanation for differences in appearance may often be found. As we all know, the plants now forming the Montgomery collection of conifers at the New York Botanical Garden came from Colonel Montgomery's pinetum at Wild Acres. There the plants spent an intermediary stage of their development and were tested for their climatic suitability. But where did they come from originally? Colonel Montgomery has earned the thanks of everyone interested in plants by having a check list prepared of his whole collection, drawn up by Mr. E. Dexter Davies in 1934, which is at our disposal and from which a great deal of valuable information may be culled.

Since the pinetum at Wild Acres has now been discontinued, it seems desirable to draw up a sort of balance sheet of the results obtained, before the lessons which it has to offer are lost to posterity. Mr. Davies' check list and the fact that I was fortunate enough to visit this little known pinetum repeatedly during the years 1933-35, when it was at the height of its development, will enable me to do so.

Let me commence with a short historical outline. The pinetum was

established in 1928 on the hundred-acre estate of Col. Robert H. Montgomery at Cos Cob, Connecticut. This estate is located in the town of Greenwich, not more than a mile from Long Island Sound and only a few feet above sea level. However, the place is well protected by dense woods and, since it includes a number of vales and dales, it offers quite a variety of different soils and exposures, very suitable for the testing of plants. In a surprisingly short time over 850 different species and varieties of conifers were brought together. These were obtained largely from nurseries and private collections all over the country, though a number of others were imported from England and Holland. This collection included not only known and named varieties and forms but also a great many odd, unnamed types which originated as chance seedlings in various nurseries. Some of them were of considerable interest and, in fact, the newly described variety of Colorado spruce,* which we have before us, originated in this manner.

Like everyone else who has tried to establish a collection of conifers in the eastern United States — outside of Long Island and a few other particularly favored spots — Colonel Montgomery found very soon that the main limiting factor was the uncertainty of sufficient precipitation, especially in the fall after a hot and dry summer. Heavy frosts on dry ground that was bare of snow caused considerable damage and succeeding losses, though this usually did not become apparent until the following year. This very common occurrence has been of much interest to me for some time, and I have often wondered whether it might not be possible to overcome this handicap at least in part through proper nutrition.

It is a well established fact that plants which are properly nourished — not just fed in the common sense of the word but provided with a well balanced diet so as to keep them at the peak of health — are much more resistant to drought than improperly nourished plants. So far as conifers are concerned, hardly any attention is ever paid to this important factor.

Since conifers in general are known to depend on root fungi — mycorrhiza — for a large part of their nutrients, it is evident that they can be kept healthy only if favorable conditions are created for the development of these fungi. What has to be taken into account also is the fact that many of these fungi are inclined to become more or less parasitic and therewith harmful when the nutrient balance in the soil is not to their liking. Actually the proper functioning of this symbiosis depends upon an equilibrium between the invading power of the fungus and the resisting power of the host plant, which is governed by soil conditions. In other words, it is necessary to pay just as much attention to the requirements of the root fungi as to those of the respective conifers, if

* Described in the Journal for May 1949.

best results are to be obtained. It is undoubtedly for this reason that so far the application of artificial fertilizers has been found to be rather unsatisfactory with conifers. Since the fungi serve as intermediaries in making nutrients available, it is necessary to supply the elements in such a form that the fungi can utilize them. If the wrong compounds are applied, bacteria will be stimulated, and this situation is likely to result in partial suppression of the fungi, with consequent upsetting of the balance of nutrients required by the conifers.

That it is dangerous to allow conifers to enter the winter with thoroughly dry root balls is commonly known, and for this reason watering in late fall is generally recommended. The main point, however, which is that such drying out results in a serious check in the development of the root fungi, is generally overlooked. It can be prevented through timely mulching with raw (undecomposed) organic matter, such as leaves, conifer needles, straw, strawy manure, etc. Contrary to common belief, peatmoss, though an excellent material for incorporation in the soil, is among the least desirable mulch materials, for the reason that it takes up and retains considerable amounts of moisture, therewith cutting down aeration as well as preventing rain from penetrating into the soil beneath it. Leafmold and decomposed manure are almost equally undesirable for the same reason. A great deal more has yet to be learned about these various interacting factors before we can hope to master the culture of conifers in the eastern United States.

For this reason, and because in all plant culture it is never possible, without making trials, to arrive at definite conclusions concerning the hardiness and the requirements of a plant, private arboreta or pineta, such as Wild Acres, serve a highly important function. Only by comparing results obtained under different local climatic conditions can a true judgment be formed.

However, a private collection has still further significance and frequently makes its most valuable contribution to general knowledge by preserving rare varieties which might otherwise be lost. At the time Colonel Montgomery gathered his collection of conifers, restrictions concerning the importation and transportation of plants were much less severe than they are at present. Thus he was able to bring together varieties from all parts of the country as well as from abroad which now are unobtainable. The cream of these have now been moved here to the New York Botanical Garden, which will make them available for further study.

(Mr. Teuscher's address will be concluded next month with a few remarks about the manner in which new types of conifers originate.)

Under Willow Trees

By Frances R. Williams

THIS is the third and concluding article in a series in which Mrs. Williams describes her numerous gardens in the shade of aged apple, willow, elm, and other trees on her suburban lot in Winchester, Mass. The previous numbers have appeared in the Journal for July and August 1949.

THE row of large willow trees across the front of my property, on the west, was formed by willow wands stuck into the ground by a neighbor more than 60 years ago, long before I came to live here. There are now nine trees left; the three beds beneath them, extending eastward toward the house, are about 12 feet wide — 6 feet for shrubs and 6 feet for herbaceous plants.

In the spring of 1948, there was a delightful grouping in the middle bed. Against the dark ridged bark of the willow, the great Solomon's seal had grown very tall, and in front of this was a large plant of the tall bleeding-heart, in full bloom. Leopard's-bane, that I had put in for its yellow color, still had a few flowers on the left of this group, and masses of *Trillium grandiflorum* were on the right. There are several groups of trillium and bleeding-heart in this bed. Four kinds of lungwort have made large mats at the edge, *Pulmonaria angustifolia* with its plain green leaves and clear blue flowers, *P. officinalis*, with mottled green and white leaves and flowers in shades of blue and pink, *P. saccharata*, the flowers blue with a bit of pink, the leaves mottled, and a variety called "Mrs. Moon," with leaves heavily spotted with white and flowers almost all pink, that holds a long time.

White violets are here and plants of Dutchman's-breeches at the front of the bed, with bloodroot and the spreading low bleeding-heart (*Dicentra eximia*), that has to be constantly thinned out. Other violets — blue, yellow, and blue and white — increase and there is a very early, low creeping

THREE HOSTA SPECIES GROWING NORTH OF HEMLOCK HEDGE

(On the opposite page)

Left, *H. lancifolia* var. *albo-marginata*; right, *H. decorata*, both photographed on August 10. Below, *Hosta Fortunei* showing its decorative buds shortly after the middle of July. Backed by a hemlock hedge which obscures the driveway from view, numerous species of *Hosta* are growing and blooming vigorously in half-shade in well fertilized soil.

THREE HOSTA SPECIES GROWING NORTH
OF HEMLOCK HEDGE

Contrast of foliage is provided by the numerous species of plantain lilies alone in Mrs. Williams' garden.

white violet that is sweetly fragrant. Myrtle at each end fills in all too fast. The spring bloom is a symphony of pink and blue.

In early spring there are also many bulbs in flower — snowdrops, crocuses, scillas, and grape-hyacinths, as well as Dutch hyacinths from bulbs that were once in the house.

At each end of this middle bed are large clumps of plantain-lilies, the tall-cluster one, *Hosta Fortunei*, and the fragrant species, *H. plantaginea*. The clumps of this latter are large enough to make a fine show in September — very lovely, especially in the evening, for their gleam of white and their fragrance. Plantain-lilies are somewhat formal for a bed with so many wilder plants, but they do give mass and stability at each end.

Bulblets of tiger lily have been scattered through this bed and now are making gay spots of color here and there. Many, many autumn crocuses (*Colchicum*) are planted throughout the entire length. The leaves in spring take up much room and in late June they give a messy effect, yellowing and drying up, but the other plants before long fill those bare spots. In September there are many beautiful lavender flowers from them

in the varying shades of several species. The true autumn-blooming crocuses, *Crocus zonatus* and *C. speciosus,* come later in the fall.

Common and Japanese barberries form a background and a screen from the street. A couple of rhododendrons here have not grown well, as they did not have good holes prepared when they were planted under the willow trees. A small plant of *Viburnum tomentosum,* a layer from my 40-year old plant, and a self-seeded butternut are growing up between the aging willows.

The south willow bed toward the drive has another viburnum of the same species between the trees. Jetbead and a couple of small rhododendrons (*R. carolinianum* and *R. catawbiense*) are the other shrubs. In the spring the guinea-hen tulip and bloodroot come up with a bit of winter aconite, shooting-star, and spring beauty. Many snowdrops come early; later there is the blue of scilla and glory-of-the-snow. Pink branched violets, yellow ones, and one with very glossy foliage fill in with pieces of the common spiderwort and Solomon's-seal.

A few plants of the blunt plantain-lily (*Hosta decorata*), are at the edge of the bed and along the walk at the entrance, a pleasant welcome with their fresh green and white leaves. A self-located plant of blue phlox is now spreading to a large-sized clump and overlapping the cement of the walk.

Near the walk I have recently made room for more herbaceous plants by taking out five old Japanese barberry bushes. New bulbs here are

Leaf pattern of one of the most striking species of plantain lily, *Hosta Sieboldiana.*

The Salem Touch

IN response to a question about when the willows were planted, Mrs. Williams wrote:

"The row of large willow trees across the front of the property on the west was formed by willow wands stuck into the ground more than 60 years ago. (It was the father of a neighbor who did it when the neighbor, now 68 years old, was a small boy.)

"I do not mind at all telling my age, which is 65; it may help the picture of why I do things as I do in the garden, but it was not when I lived here that the willows were put in. I grew up in Salem, Mass., with *those* gardens. I visited many of them frequently. There were some lovely old places that were beautifully kept up. And I remember also many of the dooryard gardens, where it was sometimes sad to observe how hard packed the soil was, how greasy looking, how underfed, as the old ladies got older and could not work so much or could not afford to hire help. It is a picture by itself.

"I never went into any of those gardens but the old lady would say, 'Oh, if you only had come last week!' or, 'If you will come next month . . .!' And I was most amused lately to find that a certain back entry of my own, where I hang my old gardening coat, has just the same smell as those dark back entries in the old Salem houses through which the old ladies used to take me to reach the back door to go out into the garden (not stylishly out the front door), and then down the garden entrance path. The collection of capes and gardening hats hung in those old entries was a choice group, that I still remember."

Muscari azureum, M. neglectum, and *M. plumosum*. There are variegated forms of bugle, one with creamy spots on the edges of the leaves and another with white veining. In spring the yellow-green of the variegated myrtle leaves, the dark blue flowers of *Muscari neglectum* and the yellow violet with apple-green leaves are attractive together.

The third small willow bed at the northern corner has rhododendron, some Japanese barberry, and a katsura tree that is badly placed and has to be kept topped under electric wires. A mock-orange has grown on the boundary. A seedling horse-chestnut is being allowed to grow, as the willows are slowly rotting from old age. There is myrtle here, ostrich fern, prickly comfrey, turtle-head, golden applemint, black cohosh, and seedlings of dame's-rocket.

For many years the leaves have collected on these willow beds, so very little fertilizer has had to be added and not much weeding has to be done. The soil is not deep, as willow roots have made digging too hard work. The beds, however, are crammed with plants. They have a great deal of bloom in spring, the nice green leaves of the *Hosta* in summer and the surprise of the *Colchicum* in the fall.

My garden is full of interest with the handsome leaves, of many shapes and sizes, in many shades of green. If you turn off the hot sunny street into my shady yard, it is like stepping into a cool, woody dell of refreshing fragrance.

INDEX OF PLANTS FOR A SHADED GARDEN

As mentioned in the series of articles by Frances R. Williams

Pages 152-156 *occur in the July Journal; pages* 175-180, *August, and pages* 196-200 *in the current number. All trees and the majority of shrubs have been omitted from this list, as have the numerous species and varieties of Hosta, in which Mrs. Williams specializes.*

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VIRGINIA WATERLEAF	*Hydrophyllum virginianum*	155
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WINTER ACONITE	*Eranthis hyemalis*	178, 199
WORMWOOD, ROMAN (not too successful)	*Artemisia pontica*	179

Plant Behavior in a Temperate Valley On a Caribbean Island

The Reaction of Familiar Species in the Unfamiliar Climate of Constanza in the Dominican Republic

By H. A. Allard

(For a description of this region where the author is advocating more extensive experimentation with crop plants and ornamentals, see "Constanza — The Valley Beautiful" in the Journal for August 1949.)

TO one who has been concerned for many years with the importance of length of day as a determining factor in plant development, the climate of Constanza in the Dominican Republic offers a challenge to be found in few other places in the world. Situated in a high valley in the CORDILLERA CENTRAL, which bisects the island of Hispaniola from west to east, the little village of Constanza combines, within a geographically tropical region, temperatures which are low enough in summer to satisfy the needs of temperate-region plants, and high enough in winter to support such tropical species as poinsettias and mangoes. While the winter temperature falls low enough to provide the chilling required by frost-hardy plants, it seldom drops so far that growth of the more tender species is completely stopped.

In winter the days are eleven hours long — about the length of late summer days in the temperate zone, when the light begins to diminish. This all means that winters in Constanza are highly favorable to the vegetative development that occurs among many crop plants in temperate regions at the end of summer. It is fortunate that an experiment station[1] is established there, for its climate makes Constanza eminently fitted for experimentation with great numbers of our useful temperate region plants, particularly those which depend on a certain length of day for their development.

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[1] This station is under the very able direction of Señor Juan Pablo Duarte M., Jéfe del Servicio de Investigaciones Agricolas, whom I have always found extremely courteous, well informed and helpful. In this same category I can also mention several of his assistants, Señor Manuel Fernandez F., who oversees the experimental plantings at Constanza, and Señor Miguel Garcia who has a similar role at the Experimental Rubber Planting Station at Piedra Blanca. It is the fine and friendly character of these workers in the Department of Agriculture of the Dominican Republic that has been a constant source of the greatest satisfaction and inspiration during my visits and travels in their beautiful country.

To explain this length of day factor briefly[2]: It has been found that temperature and precipitation alone do not reveal the entire story of the climatic adjustments of plants. Length of day is quite as important, and may even be a limiting factor in the development of many temperate region plants. The normal life cycle of a plant begins with a vegetative phase, followed at some later period by the reproductive phase culminating in flowering and seed production.

Many of our useful vegetables — cabbage, cauliflower, radishes, turnips, beets, carrots and others — are normally biennials. That is, they produce a thickened edible root or stem the first season and then flower the second season if they are planted out again.[3] In the carrot, radish and beet the root enlarges; in kohlrabi the edible enlargement is a foreshortened stem; in the cabbage we have a greatly shortened stem and a crowded rosette of infolding leaves. It is now experimentally established that all these specialized morphological structures are favored by days that are shortened below the critical length for flowering.

The longest summer day at Constanza lasts thirteen hours, making the difference between the shortest and the longest there only two hours.[4] Experimentation in northern latitudes has shown that many long-day plants — those which require long hours of light for flowering — tend to tuberize or produce rosettes, or become strictly vegetative without flower formation, as the days shorten. This would cause such plants growing in winter at Constanza to remain in a vegetative stage, which is a decided advantage in the growing of many of our useful temperate region vegetables. On the other hand, many short-day plants would not be able to initiate flowering until the length of day had fallen below thirteen hours.

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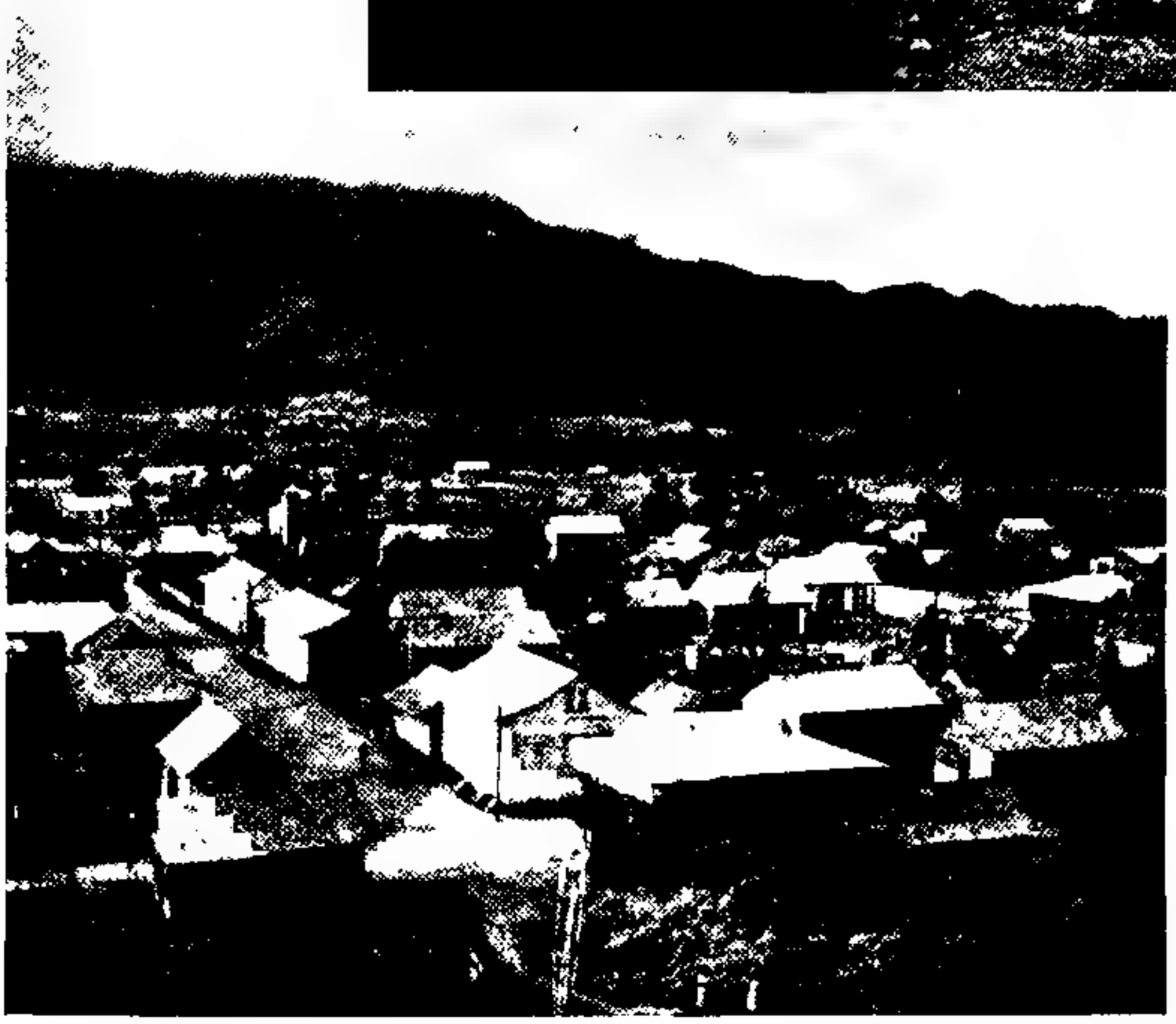
[2] It was Dr. Allard, with Dr. W. W. Garner, who within comparatively recent years, while still active in the United States Department of Agriculture, discovered that the length of day was a controlling factor in the vegetative development and flowering of many plants. For further note on their work and its significance, see the previous number of the Journal.

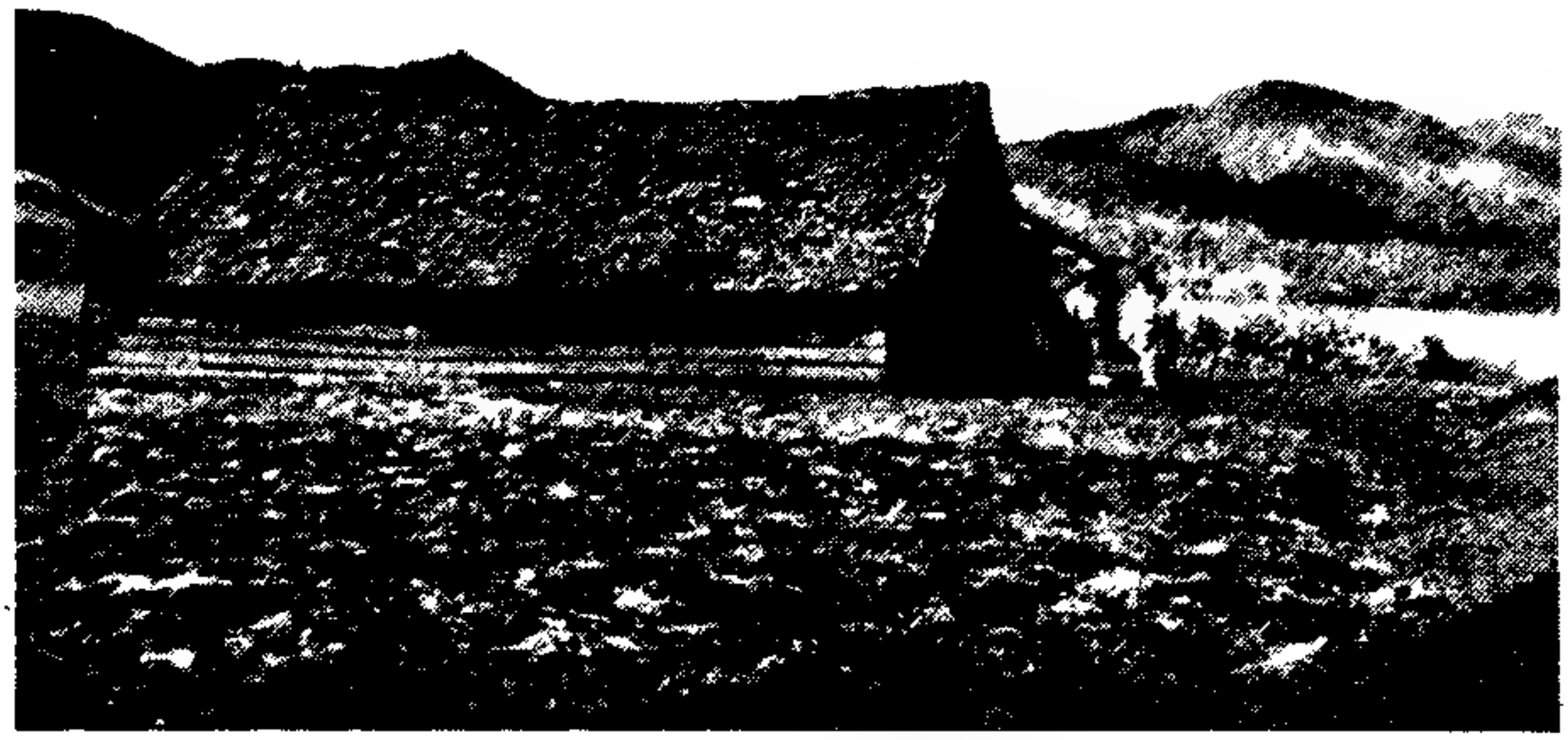
[3] Not infrequently many individual plants of a given variety are stimulated to flower very early during the first season and for this reason are called "bolters." This behavior naturally is a very undesirable one, since there is very poor stem enlargement, or no edible root, and the plant quickly runs up a flower stalk. It is now known that the very long days of the temperate zone tend to accentuate the reproductive cycle, while days below the critical length for flowering favor the pre-reproductive phase and consequent enlargement of root or stem.

[4] Constanza is near 19° north latitude and consequently from sunrise to sunset the seasonal range in length of day from December 21, when the days are shortest, to June 21, when the days are longest, varies from about eleven hours at the winter solstice to about thirteen hours at the summer solstice. There is, then, only about two hours difference, whereas at Washington, D.C., the shortest winter days are nine and one-half hours long, and the longest summer days are near fifteen hours in length — a difference for the year of nearly five and one-half hours. For the out-of-doors growing season, however, the range is from eleven or twelve to fifteen hours, making a difference of three to four hours.



CONSTANZA IN THE CORDILLERA CENTRAL OF HISPANIOLA

Above, the outskirts of the town at 7 o'clock on a late October morning. Completely hemmed in by high mountains, this small upland valley is blanketed in clouds which almost touch the housetops at dawn. Later, as the cool morning air is warmed, the clouds are pushed up high into the surrounding mountains drenching them with mist. *Below,* a view of Constanza, built on a valley floor 3,500 feet above sea level. The mountains, with clouds hiding their crests, are about 2,000 feet higher.



The main building (rancho) on the grounds of the Agricultural Experiment Station at Constanza. It is thatched with elephant grass (*Pennisetum purpureum*).

Similar situations hold for some of our tuber-forming perennials. Dr. W. W. Garner and I found that dahlias produce fibrous roots on long days and tuberous roots on short days. Jerusalem artichokes produce slender underground stems on long days and tubers on short days. In the Constanza Valley I have observed that dahlias appear especially thrifty and floriferous, probably because there is a rather nice relationship between the above-ground flowering phase and the below-ground tuberizing phase, largely based on length of day, which here would tend to make these plants ever-flowering.

In the tropics generally, and in cool altitudinal temperate climates such as Constanza enjoys, high light intensities obtain during full sunlight. It is probable that here and elsewhere in the tropics a better balanced spectrum obtains, which, together with the high light intensities, would favor greater carbohydrate formation. This condition, along with the shorter lengths of day highly favorable to the vegetative phase of development [5] unquestionably plays an important role in the successful growing of such temperate region plants in the high, cool Constanza Valley.

Blackberries and raspberries appear to do well at Constanza, and I should expect this behavior since a wild native high blackberry grows

[5] The vegetative phase referred to is the kind which expresses itself in tuberization or root enlargement (beet, radish, turnip, celeriac; stem enlargement (kohlrabi), leaf rosettes (cabbage); buds (Brussels sprouts).

Señor Fernandez standing beside a test row of annual sweet clover (*Melilotus alba*) growing on the grounds of the Dominican Republic's Experiment Station at Constanza.

in the pine forests of the mountains around. While I saw no evidence that the northern small bush fruits, such as currants and gooseberries, had been tested here, I feel that there is a good field for experimentation with these in the Constanza Valley, or in the neighboring higher mountain areas. Though the natives of this region do not yet appreciate any of these small fruits, they would have a high food value for the populace since they would add savor and health-promoting qualities traceable to vitamins and various mineral salts.

The satisfactory behavior of other food and forage plants — such as beets, peas, most of the grains, coffee, alfalfa, white sweet clover, all the cucurbits but particularly the chayote (*Sechium edule*), citrus fruits, pomegranates, figs, and quinces, avocados, mangoes, onions and garlic, YUCA or manioc — indicates the desirability for further experimental research on crops that are adapted to this remarkable temperate climate in the tropics. The fact that other plants are not successful here — among them persimmons, rice, grapes, bananas and plantains, papayas, coconuts,

and most of the temperate zone tree-fruits — adds interest to the problem for the botanist studying distributional patterns as well as for the agriculturist testing useful crops. The ecologist, for example, may be concerned over the fact that, while the royal palm, which reaches its climax not far away, can be grown in the Constanza Valley, it is rarely planted here because it will not flower or fruit.

On the other hand, while the tropical mango is particularly at home at low altitudes, it produces fruits also in the cool temperate climate of Constanza, where such temperate region plants as the pine and cedar or SABINA (*Juniperus gracilior*) naturally occur, although the trees remain small. A careful study of the natural occurrence of the native shrubs, trees and herbs of Hispaniola would undoubtedly throw much light on the physiological requirements and ecological factors limiting the range of these into the higher altitudes as at Constanza. If it is a fact that such trees as the sandbox tree or JAVILLA (*Hura crepitans*), the poinciana or CLAVELLINA (*Poinciana pulcherrima*) and the cashew or CAJUIL (*Anacardium occidentale*) can grow and flower, yet fail to produce seed at Constanza, it is obvious that critical factors operate which would inhibit their natural distribution into these higher altitudinal regions.

The intermingling of certain purely tropical species of plants with temperate-region forms as in the region of Constanza does not seem so anomalous when one recalls that during Cretaceous times, if the conclusions of geologists are correct, a warm, even subtropical climate reigned over much of the earth, even to the Poles, and it was devoid of the marked zonal and seasonal differences that we know today. An interesting feature of this widespread uniformity of climate, so far as available fossil evidence has revealed, was the intermingling of what today appear to be tropical and temperate region species even in Greenland and northern Alaska. It is of more than passing scientific interest perhaps that in the Constanza region the mild or warm temperate climate, in spite of its occasional brief spells of freezing in winter, with frost and even ice, there is a similar intermingling of certain warmth-loving tropical species and temperate climate species. It is even of greater interest that, for the most part, these plants either must have short-day requirements or they are day-neutral.

The poinsettia is definitely a short-day plant, flowering best when the days are not much above twelve hours in length, and must be considered a truly tropical plant. Nevertheless it thrives everywhere in the Constanza Valley as well as at sea level, and is even more compact in its habit of growth here. It is not only extremely floriferous but develops an intensely crimson coloration for a long season. Occasional extreme chilling or even frost does not appear noticeably detrimental to this shrub. With

these facts in mind it is easier to understand the theories of plant distribution in Cretaceous time.

But of more immediate concern are the possibilities for purely scientific and for practical experiments with plants in the valley of Constanza, for there are few places anywhere which are so favorably situated for experimentation with a great variety of fruits and vegetables.

The experiment station at Constanza, although working with a limited staff and funds, is already carrying on much useful investigation in its studies of plants adapted to this temperate climate. There is a very fertile field here for practical breeding work and selection for the special climatic conditions of this tropical zone, involving short days, cool temperatures and favorable chilling in winter.

Keeping Japanese Beetles out of the Rose Garden

By Walter E. Fleming

THE rose is one of the most favored food plants of the Japanese beetle, *Popillia japonica,* and all types of roses are subject to attack. The beetle is particularly fond of the blooms, attacking them when the color begins to show between the sepals. A single beetle feeding on a developing rose can destroy its symmetry and beauty. When numerous, the beetles may cover the blooms so completely that the flowers resemble huge blackberries, and they soon reduce the foliage to a lacy structure.

THIS paper gives a summary of the remarks made at the seventh annual Rose-Growers' Day at the New York Botanical Garden June 9. The author is a member of the staff of the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture, Agricultural Research Administration, stationed at the Japanese Beetle Laboratory at Moorestown, N. J.

To make the information presented herewith of greatest possible practical use to the rose grower, directions for the use of each compound suggested for control of the Japanese beetle are printed in italics.

A Problem of Protection

The control of the beetle in the rose garden during the summer months is not a problem of prevention, but one of protecting the plants from serious injury. Unfortunately, no practical method has been developed to give full protection to the blooms. The beetles will attack any portion of the plant that is not covered by an insecticide. It has been the practice of some rose growers in the older in-

fested areas to spray the foliage to protect it from severe injury and to remove all buds developing during July and the early part of August. Later, when beetles become scarce in the vicinity, the buds are permitted to develop. By giving the plants a rest from blooming during this period, many flowers of good quality will be produced late in the summer and in the fall. Choice plants may be protected by the use of netting or screening, but this method is practical only on a small scale.

Sprays and Dusts

One of the most effective spray materials for killing beetles and protecting plants is **DDT.** The 50-percent wettable powder and the emulsion are the forms generally used for control of the beetle.

Use wettable **DDT** *powder at the rate of 1½ tablespoons per gallon, or 2 pounds to 100 gallons of water.*

Use the 25-percent **DDT** *emulsion at the rate of 4 teaspoons per gallon, or 2 quarts to 100 gallons of water.*

Lead arsenate is effective for a period of 4 weeks, but it drives off more beetles than it kills.

To make a spray, mix 3 tablespoons of dry lead arsenate and 2½ tablespoons of wheat flower with 1 gallon of water, or use 6 pounds of lead arsenate and 4 pounds of flour to 100 gallons of water.

Proprietary sprays containing ***rotenone*** are available on the market and, when used according to directions, are usually effective in protecting the foliage for 5 to 7 days.

Pure gamma benzene hexachloride will afford protection for about the same period. *Use the 25-percent wettable powder at the rate of 1 tablespoon per gallon, or 1 pound to 100 gallons of water. Use the 20-percent emulsion at the rate of 1 teaspoon per gallon, or 1 pint to 100 gallons of water.*

In the application of these sprays, *timeliness* and *thoroughness* are most important. As a rule, the spray should be applied as soon as the first beetles appear in the vicinity and before feeding becomes general. Additional applications may be needed, depending on the material used, the weather, and the growth of the plant.

Contact sprays, when properly applied, will kill a large number of beetles on the plants at the time of application, but their use will not prevent the plants from becoming reinfested and subsequently injured. One of the best contact sprays is composed of ***sodium oleate*** and an alcoholic extract of ***pyrethrum flowers*** diluted with water. Proprietary sprays containing these ingredients are sold by reliable dealers and, when used according to directions, they are usually satisfactory.

The rose grower must contend not only with the Japanese beetle but also with a host of other insects, and also with the fungus diseases mildew and black-spot. It is not practical to apply separate control measures for each pest, except in an emergency. Satisfactory control of the pests in the rose garden has been obtained with a ***general-purpose spray*** containing DDT, rotenone, ferric dimethyl dithiocarbamate, and sulfur. Several general-purpose sprays are available from reliable nurseries dealing in roses, and, if used as directed, can be expected to give satisfactory results.

Most of the insecticides mentioned are poisonous and should be handled with reasonable care. Since rose growers are accustomed to the use of insecticides, detailed discussion of precautions seems unnecessary here.*

Traps, painted yellow and baited with a mixture of anethole and eugenol, may capture enormous numbers of beetles, but it is a mistake to place them in or near a rose garden. The odor of the bait, blending with the natural attractiveness of the flowers, draws beetles from nearby areas and definitely increases the number of beetles on the roses. As traps usually

*However, for the uninitiated, it should be said that many of these substances, particularly DDT and lead arsenate, are toxic to animals and often to human beings also. Great caution therefore should be exercised in using them. Excessive contact with the skin should be avoided, and the materials should be stored out of reach of children and animals.

capture not more than 25 percent of the beetles in the vicinity, they cannot give adequate protection to rose bushes.

Destroying Grubs

Treatment of soil in the rose garden and close by is helpful in a few situations. The beetle lays eggs most readily in the grassy paths of the rose garden and in lawns, and the grubs hatching from these eggs may be sufficiently numerous to destroy the turf, though in the rose beds they rarely cause serious damage to the bushes.

The grubs can be destroyed by treating the grass and the beds with 10 percent of **DDT** *at the rate of 6 pounds to 1,000 square feet.* This can be mixed with water, soil or sand to the proper proportion.

Another poison to use against grubs is 5 percent ***chlordane*** *at the rate of 4½ pounds to 1,000 square feet.*

Although the application of these treatments to the soil will reduce the number of beetles to be controlled on the roses, complete protection cannot be expected because the beetles are strong fliers and many of them are attracted to the rose garden from untreated areas nearby.

Greenhouse Procedure

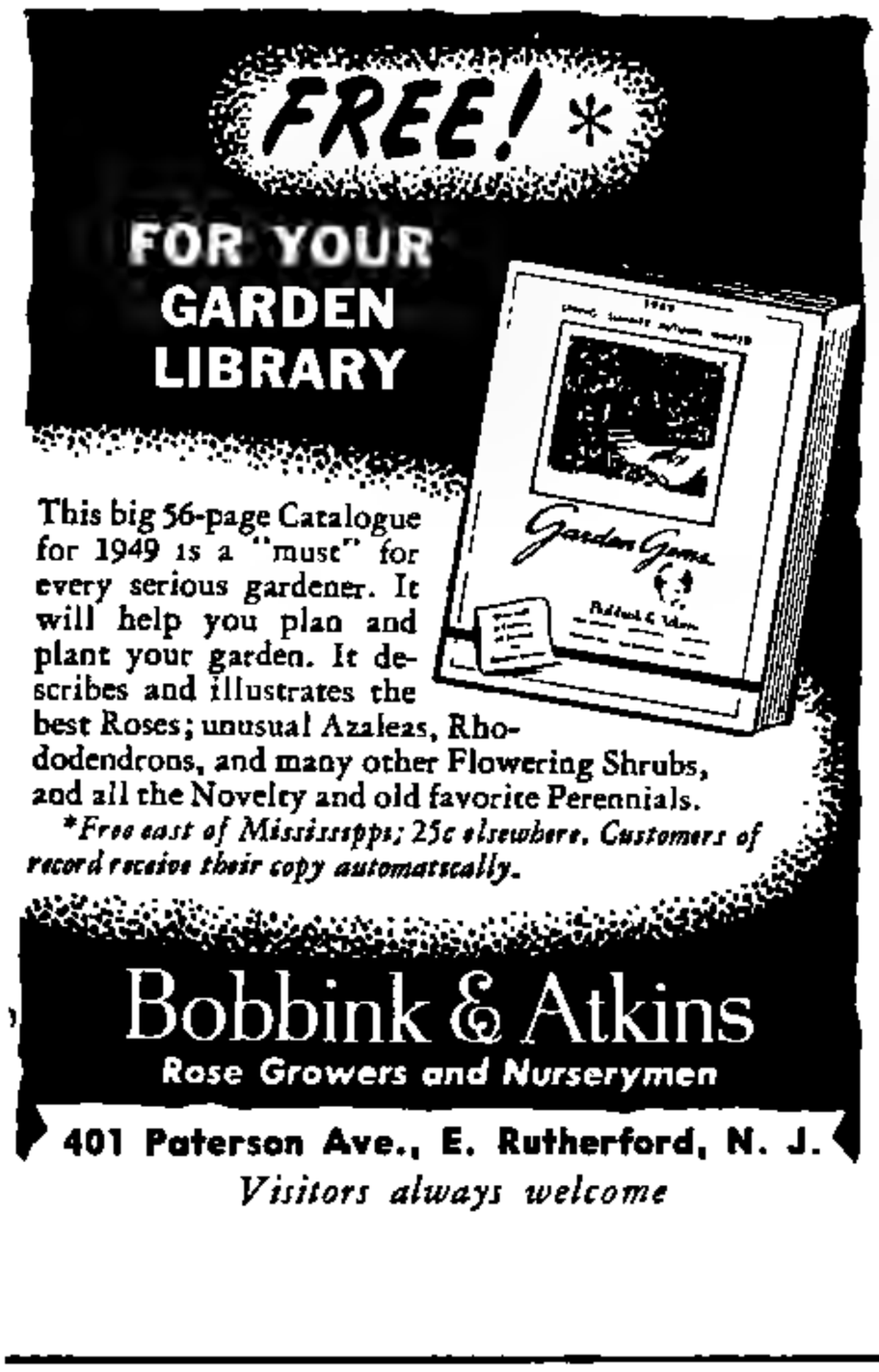
Japanese beetles sometimes become troublesome in winter rose gardens maintained in greenhouses. Sometimes the beetles enter the houses during the summer and lay their eggs there, or the grubs enter with infested soil used in the greenhouse. In either case, the warmth causes some of the beetles to mature and come out of the soil during the winter. Control in greenhouses is largely a problem of prevention rather than of cure. The development of the grubs hatching from eggs laid by the beetles in the soil can be prevented by treating the soil in the beds and in the walks with DDT or chlordane.

DDT *is used in the greenhouse at the rate of 1 ounce of the technical (100%) material per cubic yard of soil.*

Technical chlordane *is used at the rate of 2/5 ounce per cubic yard of soil.*

To facilitate the mixing of these small quantities of insecticides, it is suggested that *3 pounds of 2 percent* **DDT**, *or 2 pounds of 1 percent chlordane,* be used for each cubic yard.

Either of these materials should be worked into the soil of the beds and walks before the beetles invade the greenhouse during the summer. They should also be mixed with the top-dressings. When the soil is replaced in the beds, DDT or chlordane should be thoroughly mixed throughout the mass of soil before it is placed in the beds. The DDT treatment will prevent the development of the grubs for a period of at least five years and the chlordane treatment for at least two years.



NOTICES AND REVIEWS OF RECENT BOOKS

Amateur Orchid-Grower's Guide

ORCHIDS ARE EASY TO GROW. Harry B. Logan & Lloyd C. Cosper. 312 pages, drawings by Lynette Arouni, bibliography, index. Ziff-Davis, New York, 1949. $6.

This book is a well written, beautifully illustrated, practical presentation of the fundamentals of orchid growing for the amateur. Without being overly detailed, it serves as an excellent working guide. The enthusiasm of the authors is contagious and should serve to recruit many an amateur gardener to this fascinating hobby. While the book is thoroughly up-to-date, it should be noted that nothing is said about the use of fluorescent light as an inexpensive source of light permitting the growth of orchids in situations lacking adequate natural light — a frequent occurrence in the city.

CLARA A. BJERKNES,
Haskins Laboratories.

Wine from California

VINES IN THE SUN. A Journey through the California Vineyards. Idwal Jones. 253 pages, illustrated, indexed. William Morrow, New York, 1949. $3 50.

For those interested in the history of viniculture in California, Idwal Jones has written an interesting and colorful story of the vine plantings and wine makings from the days of small beginnings in the early missions to the five-thousand-acre vineyards and million-gallon wineries of today.

While the grapes grown for wine in California are European varieties, the wines differ from those made from the same varieties in France or Italy. A grape which makes a superior wine in certain sections of France may be useless as a wine grape in California. Soil, temperature, and climate all affect the character of the wine. In this connection it is pointed out that, in general, the warmer sections of California produce the good dessert wines while the cooler sections produce the better dry wines.

Many interesting characters appear in the story, among them one Thomas Lake Harris, a religious prophet and seer who founded the "Brotherhood of the New Life" and established a colony at Santa Rosa with seventeen hundred acres of vineyard. Before coming to California a colony had been established at Brocton, N. Y., on Lake Erie. In several references to this parent colony the book erroneously locates it on Lake Keuka in New York.

An appendix lists a number of the more familiar California wine grapes and describes the wines that they yield.

F. L. ARLAND,
Hammondsport, N. Y.

Indian Rituals with Corn

GREEN CORN CEREMONIALISM IN THE EASTERN WOODLANDS. John Witthoft. 91 pages. University of Michigan Press, Ann Arbor, 1949 $1.50.

This booklet brings together the available information on the status of corn *Zea mays,* among the various Indian tribes inhabiting the eastern woodlands of the United States.

Descriptions of the ritual associated with the ripening of corn by the different Indian tribes are given freely throughout the text. The green corn ceremonies often included such activities as all night dancing, burning of old tobacco leaves a special rectangular ceremonial area, and distinct parts for the men and women participating. The ritual served as a period of thankfulness, prayer and rejoicing for the harvest and food indicated by the corn crop.

The booklet is written from an anthropological and historical standpoint

GILBERT H. AHLGREN
College of Agriculture
Rutgers University

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Malaysian Plants

FLORA MALESIANA. C.G.G.J. Van Steenis, general editor. Series 1, Spermatophyta. Volume 4, part 1. 40+39 pages, illustrated. Noordhoff-Kolff, N.V., Batavia, Java, 1948.

The first part of the new "Flora Malesiana," on which the distinguished editor, Dr. C. G. G. J. Van Steenis, was working when he visited the New York Botanical Garden last year, was issued last December and has just reached us. It includes taxonomic monographs of the Aceraceae, Philydraceae, Ancistrocladaceae, Aponogetonaceae, Actinidiaceae, Burmanniaceae, Sphenocleaceae, Nyssaceae, Sarcospermaceae, and Stackhousiaceae by recognized specialists in these groups. Included also is an introduction giving a résumé of the history of botanical work in the Malaysian Archipelago, an explanation of the plans for the present work, and 22 extremely valuable pages on general considerations, with classification, description, and illustrations of phenotypic and genotypic variations which must be understood by all workers on a flora such as this. It is contemplated that this Flora, profusely illustrated by maps, photographs, and line-drawings, and embracing about 32 volumes, will be completed in 25 years.

H. N. MOLDENKE.

From Firsthand Acquaintance

ECUADOR AND THE GALAPAGOS ISLANDS. Victor Wolfgang von Hagen. 290 pages, illustrated, indexed. University of Oklahoma Press, 1949. $3.75.

Von Hagen's colorful descriptions are firsthand, and form an excellent introduction for one unacquainted with Ecuador's history, people, topography and products. The reader interested in economic botany will find a good account of panama hat making, the "quinine-rush," and the search for cinnamon. A few noteworthy details are given concerning the jungle and use of jungle plants, as well as plant products in Ecuador's economy.

The section on the Galápagos Islands contains a wealth of well arranged historical material. One might wish, however, that he had given a summary of the many interesting floral and faunal features of the islands rather than an estimate on the correctness of the scientific theories regarding the islands.

A bibliography is included which, though it may be a help in further reading, is incomplete.

SHERWIN J. CARLQUIST,
University of California, Berkeley.

Guide Minus Index

THE SOUTHERN GARDEN BOOK Louise & Donald Hastings. 276 pages, illustrations, plant lists and tables. Doubleday & Co., Garden City, N. Y., 1948. $4.95.

"The Southern Garden Book" is strictly for the amateur. Although it is about the best available book on gardening and plant materials in the South, it is written in too superficial a manner to be of great value either as a text or as a gardener's guide without the use of considerable supplementary material. The species names are almost entirely eliminated in the chapters which list and describe plant materials—and, after all, common names vary considerably even throughout the South.

Two chapters are devoted to annuals, perennials, and biennials without correctly defining the first two and without even offering a definition of biennials. On page 140 reference is made to the "perennial *family*."

In addition there are a number of erroneous statements. If the term "low-analysis fertilizer" (page 17) is to be used, it should be correctly defined. The forcing of plants into growth by the use of fertilizer in the fall has little to do with whether the analysis is high or low; it is mostly dependent upon how readily available the essential elements are.

Further, the use of vitamins does not necessarily produce a large root system. Most experimenters have found that the results from the use of vitamins have not been consistently helpful. Pear blight (page 245) is not a physiological trouble. Recent investigators have found that cutting stems "under water to eliminate the air blocks in the tubular passages" (page 257) does no particular good.

Apparently the book is a series of lectures put together in a very logical manner. Despite this order an index would have materially increased its usefulness. It is unfortunate that a more accurate, more scientific book is not available for the South.

ROBERT S. REICH,
Louisiana State University.

New Products for Plant And Pest Control

CHEMISTRY OF INSECTICIDES, FUNGICIDES AND HERBICIDES. Donald E. H. Frear. 417 pages, illustrated. indexed. Van Nostrand, New York. 2nd edition, 1948. $6.

In 1942 Dr. Frear published a handbook on the chemistry of insecticides and fungicides. In the meantime several outstanding new materials have appeared. The quinones and the dithiocarbamates have opened a whole new field of organic fungicides. DDT and other chlorinated organic insecticides have added new vistas to the field of organic insecticides. Also, since the first volume was published, the whole field of hormone weed killers has been developed.

The rise of these new compounds and new fields has impelled Frear to write a second edition of his earlier handbook. The book deals primarily with the chemistry and the physics of the compounds and has essentially no data on consumption or directions for use. It is descriptive rather than dynamic. It merely lists the compounds and describes how they are manufactured and prepared. This is a book of particular use to chemists and those whose business it is to manufacture insecticides and fungicides. It is of much less interest to biologists.

JAMES G. HORSFALL, *Director,*
Connecticut Agricultural
Experiment Station.

Help for Entomologists

CHEMISTRY AND USES OF INSECTICIDES. E. R. de Ong. 345 pages, illustrated, indexed. Reinhold, New York, 1948. $6.

E. R. de Ong has written a practical book on the chemistry and uses of insecticides which should be welcomed by any other consulting entomologist, whether he be a free-lance one like de Ong himself or one employed by the Government. This is a cook-book type of presentation, more concerned with the uses of insecticides than with their chemistry.

To de Ong, an entomologist, it is perhaps natural to include fungicides among insecticides. The approach is purely pragmatic and adds more confusion than clarity to the subject. If a word is required for practical use, this reviewer would prefer the word "pesticide" to cover both materials. Perhaps because this is a practical book, de Ong lists heat, cold and radiation as insecticides. Of course, to a physicist heat and cold are both phases of radiation and are not to be distinguished in those terms.

De Ong's book differs from that of Frear's in that it deals with such details as shipping, containers, and statistics, as well as the physical and chemical constants of the compounds. He also discusses additives and the compatibility of each compound with other pesticides that may be used simultaneously. There is some evidence of inefficient proof-reading — "Anzou" for Anjou" pear and "oxodizing" for "oxidizing" (both on page 244).

The book concludes with a series of very useful appendices.

JAMES G. HORSFALL, *Director,*
Connecticut Agricultural
Experiment Station.

BRIEF BOOK NOTES

Text and Reference Works

HISTORICAL GEOLOGY. Carl O. Dunbar. 567 pages, illustrated, indexed. John C. Wiley, New York, 1949. $5.

This excellent text continues a long tradition of good books by the same title under a series of authors from Yale University. With type that makes reading easy and an abundance of illustrations, well explained, the volume gives a solid, fundamental background in geology.

PROCEDURE IN TAXONOMY. Edward T. Schenk and John H. McMasters. Revised edition, enlarged and in part rewritten by A. Myra Keen and Siemon William Muller. 93 pages, indexed. Stanford University Press, Stanford, Calif. 1948. $2.50.

Botanists who are concerned with their own International Rules of Nomenclature, which have been made available to them in printed form only within the past year, will find this translation of the International Rules of Zoological Nomenclature, with its comments, of interest, particularly for purposes of com-

paring the systems of naming used in the two branches of biological science.

LOGGING — The Principles and Methods of Harvesting Timber in the United States and Canada. Nelson Courtlandt Brown. 418 pages, illustrated, indexed. John C. Wiley, New York, 1949. $5.

This is a book for the lumberman filled with details of the trade, from forest utilization (chapter 1) to a summary of regional logging methods (chapter 24). The book is in six parts, five dealing with preparation for and methods of log transportation by water and land.

Historical

YELLOWSTONE NATIONAL PARK. Marie M. Augspurger. 247 pages, illustrations, index, bibliography. Published by author, R.R. 2, Middletown, Ohio, 1948. $5.

The history of Yellowstone presented in this monographic work has been taken from diaries of explorers in the early part of the 19th century, and from numerous books and records dating from the later 1800's and continuing to 1940.

THE FARM BUREAU THROUGH THREE DECADES. O. M. Kile. 416 pages, indexed. Published by author, National Press Bldg., Washington, D. C. 1948. $3.50.

The Farm Bureau, which was organized in the United States just before 1920, now is operated in every state except Maine, Rhode Island and Pennsylvania. Mr. Kile's book tells what preceded it and how it has influenced American agriculture during the past 30 years. His conclusion is that in its aim to "Build a Better Tomorrow" for agriculture it is well equipped with experienced leadership and a sound financial basis. Its work is in organizational, service, economic, educational, and legislative lines.

Of Mountains and Forests

THE VALLEY OF FLOWERS. Frank S. Smythe. 325 pages, illustrated in color, indexed. W. W. Norton Co., New York, 1949. $5.

A garden-loving mountaineer's ascent of a peak 25,447 feet high in the Himalayas is contained in "The Valley of Flowers." Readers who have a rock garden will revel in his accounts of the moraine plants that they most cherish, and will delight in the natural color photographs of their native habitats.

The author, who was a renowned British mountain climber, died in England in June at the age of 48. "Snow on the Hills" is an earlier book of his and "Mountains" a forthcoming volume.

HIGH JUNGLE. William Beebe. 379 pages, illustrated, indexed. Duell, Sloan & Pearce, New York, 1949. $4.50.

This 22nd book by the Director of Tropical Research of the New York Zoological Society takes the reader to Venezuela, where the author and his wife spent parts of the years 1945-1948. Insects, birds, and fishes become part of their jungle life, some of which is recorded in the form of a diary.

PILCHUCK. The Life of a Mountain. Harry W. Higman & Earl L. Larrison. 288 pages, illustrated with drawings by Edmund J. Sawyer, indexed. Superior Publishing Co., Seattle, 1949. $3.50.

Here is a complete story of what constitutes "life" on a mountain at the edge of the Cascades, written delightfully by two men who have known it intimately—a biologist and a conservationist. Though an intensive study, it is presented so simply and with such realism that a child as well as an adult can enjoy and understand it.

YOSEMITE, THE BIG TREES, AND THE HIGH SIERRA. A Selective Bibliography. Francis P. Farquhar. 104 pages, quarto, illustrated. University of California Press, Berkeley and Los Angeles. 1948. $7.50.

The interesting part of this unusual "bibliography" is the comments on the two dozen works, each one of which occupies a chapter. "The whole category of technical books and papers has been omitted from the present compilation," says the author. Instead, he regales the reader with reports of on-the-spot tales which date from Zenas Leonard's narrative of 1839 to a Japanese mountain climber's own summary of his volume, "The Conquest of Mount Whitney," which was published in Tokio in 1931.

Price Correction

The "Home Gardener's Pronouncing Dictionary," issued by *Better Homes and Gardens* magazine, is priced at 50c, not 75c as originally announced and as recorded in the June Journal. It is available from the Meredith Publishing Co. 1716 Locust St., Des Moines, Iowa.

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JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

OCTOBER

1949

IN THIS ISSUE:

NEW TRENDS IN GROWING GRASS

HOW VARIETIES OF CONIFERS ORIGINATE

MIMOSA WILT

SALT-RISING BREAD

REVIEWS AND NEWS

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Nov. 5	***Scottish Gardens and Their Surroundings***	*Alice Chauncey*, Photographer and Lecturer
Nov. 12	***A Conservation Lesson for New Yorkers***	*Harold C. Kimball*, Southern New York Fish & Game Assoc.

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New Trends In Growing Grass

By Nelson M. Wells

GROWING grass is big business. Most home owners will agree when they recall their trials and tribulations in getting a turf established and then everlastingly mowing it. Few realize however, that the kinds of grass plants used for lawns in America were all introduced into this country, instead of being native species naturally adapted to the climate. Though they may thrive in the moist atmospheric conditions of England or the State of Washington, they still leave a lot to be desired even in the humid northeastern states. This may be due largely to the general practice of close mowing which permits the intimate action of the sun on their poor unshaded roots or perhaps the lack of fertilizing and cultivation. However, new kinds of grasses may be developed or discovered and there is prospect of better methods of caring for the established turf. In the meantime, the establishment of grass on public works programs, following the age-old systems, is running into millions of dollars every year.

It was about the turn of the century when grass for turf was taken up seriously for the first time in America. This was occasioned in large

About the Author

MR. Wells, who at one time was a member of the Park Department of New York City and was for several years President of the City Gardens Club in New York, is now Director of the Landscape Bureau of the State Department of Public Works in Albany, N. Y. He contributed an article entitled "Trees and Shrubs in New York City and Some Observations on Their Growth" to the Journal of the New York Botanical Garden in September and October 1938.

measure by a new enterprise, the building of golf courses. Much has been learned in these fifty years but it now appears that much more remains to be learned.

Grass problems are popular topics of discussion at even the cocktail hour. At least two in every such group seem to have been on a greens committee of some golf course and are ready to offer an opinion on the merits of a certain strain of bent grass, or some profoundly titled new chemical for controlling a bacterial disease of grasses. With such increasing interest and knowledge the challenge becomes great for the agricultural experiment stations and agronomists in general to point the way to still better turf.

One series of grass problems is closely related to conservation and particularly to the saving of valuable topsoils. This phase of the work has not yet reached the small home owner, nor even the golf courses to any appreciable extent. It is growing up on large development projects such as airfields, highway roadsides and open areas on the grounds of institutions and industries. The objectives are far removed from the home lawn but the problems are fundamental and their outcome may well have reflections on turf problems in more intimate surroundings.

An example of such work is on airfields. The need here is a vegetative cover for erosion control. This does not have to be a fine, continuous growth of a creeping grass for the sake of appearances, the lie of a golf ball, or resistance to the blows of a number 8 iron. It does have to be continuous enough to keep the surface soil from washing away or being blown into the air to injure the propeller blades or the bearings of the engines. The kinds of soils to support such growth and the kinds of grasses, sedges or legumes to endure on these soils are closely related problems.

A practice which has been accepted for many years when building a lawn has been first to put down a layer of good topsoil. This was two or three inches in depth if topsoil was scarce, or eight or ten inches deep where topsoil was plentiful or the needs were critical. If this had been a requirement on each of the airfields of one to six hundred acres built during the recent war years the farms over vast areas of the globe would have been depleted of their topsoil. A different program was followed, however. After the grading was completed the surface soils were analyzed, some soils were amended to meet a desired consistency and then a selection of grasses was applied and successfully grown by carefully managed fertilizing, and often without any topsoil whatever.

Growing grass without topsoil is finding favor in highway construction programs also. When highways are built in hilly or mountainous country it frequently happens that deep cuts are required. The soils exposed and the fills which are made from these cuts represent soil horizons at depths from ten to even fifty or more feet below the original

TODAY'S WAY OF STARTING GRASS ON ROADSIDE SLOPES

Upper left: Lime, fertilizer, and grass seed are being distributed by water pressure with an orchard spraying rig. *Center right*: Hay for mulching is being blown onto seeded areas by an ensilage blower. *Center left*: This erosion-proof turf, photographed in May, was started the preceding September on the raw bank shown at the lower right. Only fertilizer, seed, and mulch were used on the poor, stony subsoil. With continued fertilizing for a few years, several inches of topsoil can be produced.

* * *

For previous information on this subject, see the Journal for May 1949 in which John L. Wright, Director of Roadside Development in Connecticut, tells of the method devised by his State Highway Department for seeding roadside slopes economically by spraying seed and fertilizer over a layer of mulch.

surface. All classes of soils are encountered, from sands, clays, gravels to shales. With the customary practice of seeding grasses on only soils of good tilth and high organic content it is difficult to believe that even an erosion-proof type of vegetation could be established and maintained on such an unpromising looking foundation.

It is true that such work is in a pioneering stage. The new developments are radical departures from practices heretofore applied and many answers are still to be secured. But the present status may be of general interest and, like the developments in atomic power, the work being done today may have far-reaching effects in soil conservation, adding to the supply of topsoil, discovering short cuts in seeding methods, and reducing the work of turf maintenance.

First, with regard to the soil. Most research to date has been concentrated on producing plant growth on the kinds of soil which are already known to be able to support plant growth. Where inert, sterile soils are involved, the concern lies primarily with its mechanical consistency. That is, a soil composition which comprises those proportions of coarse and fine particles which will accommodate root penetration have certain amounts of air present and permit the movement of soil waters in the amounts proper to carry plant foods for the roots to absorb. This may mean adding sand, clay, silt or gravel to modify several inches of the surface layer. Soil analyses are extremely important to determine soil particle gradations, degrees of acidity and the presence of plant foods.

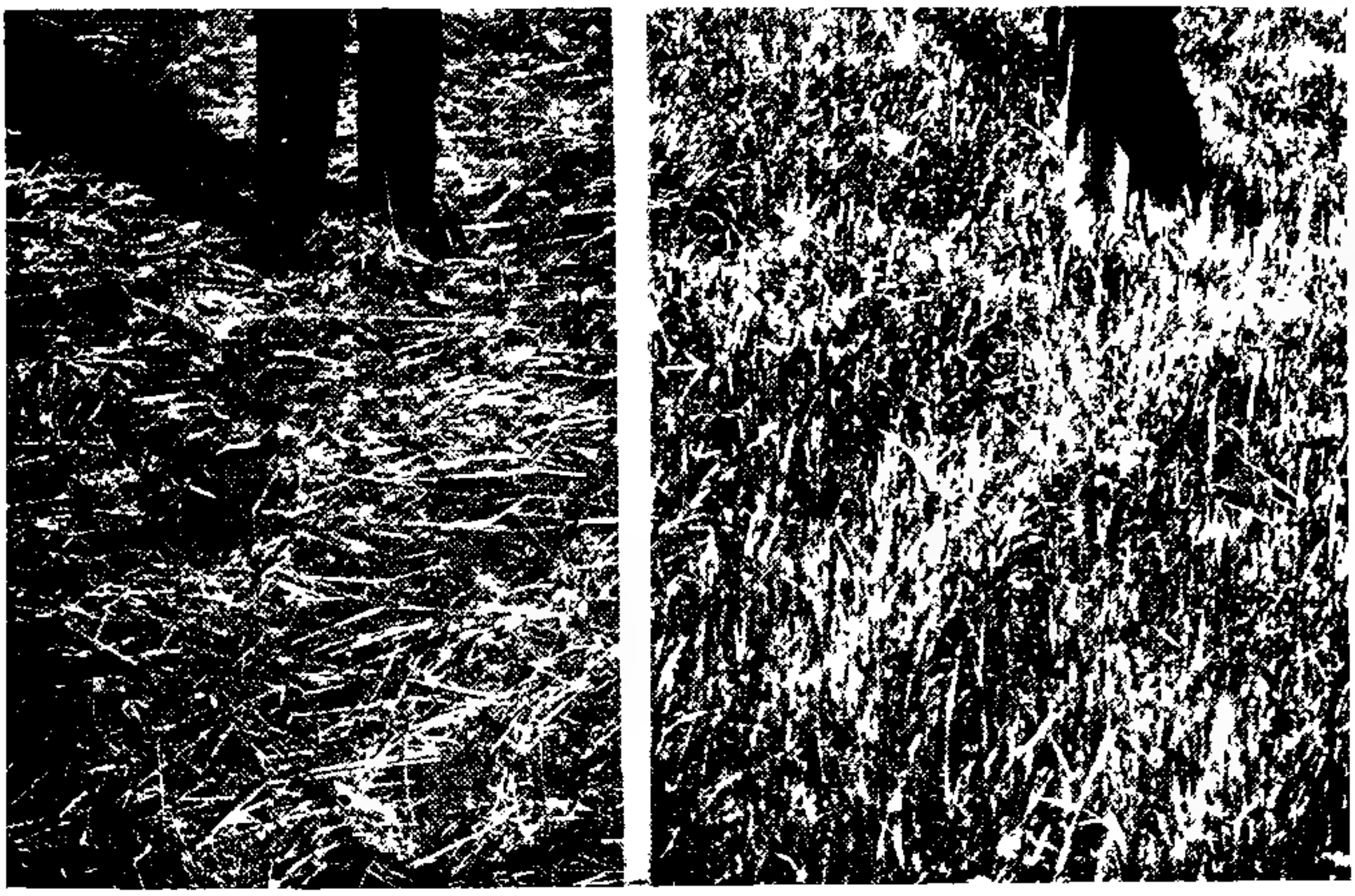
Next, with regard to the kinds of grasses. Research to date seems to have focused on two classes — rank, fast growing types for forage purposes, and perennial creeping types for lawn effects which are to be frequently mowed. Not so much is known about grasses or legumes which will grow on soils of low fertility and low moisture content. A new strain of Kentucky bluegrass, known as B-27, has some of these qualities and a fescue called Alta fescue is particularly promising in some sections of the country.

Dwarf grasses are a further objective of modern research. Such grasses have undoubtedly been discovered and discarded because of their insignificance for agronomic purposes. They need to be rediscovered to find those which will make an adequate cover and at the same time require but one mowing a year or perhaps none. Buffalo grass, (*Buchloë dactyloides*) of the western plains and, where hardy, two Japanese grasses, *Zoysia japonica* and *Zoysia matrella*, have promise in this respect. Others undoubtedly will be found. Certain varieties or strains of creeping red fescue such as Olds, Illahee and Quebec Wild grow only to a height of six or eight inches. Their seed heads are less freely produced on well established plants and need only occasional mowing for appearances, or conserving plant energies. Otherwise the grass leaves make a pleasing

and reasonably uniform cover at a low level. Such a growth is not neat enough in appearance for a garden lawn but is wholly adequate for airfields, non-use areas, and highway roadsides which are not closely scrutinized.

Although seed bed preparation was formerly considered of prime importance, it can often be omitted if certain other provisions are made, such as seeding in mid-winter to take advantage of the honeycomb stage of the soil in early spring, or seeding on freshly graded earth surfaces. Otherwise it appears necessary to scarify the soil just enough to break up the thin surface crust. Mulching with a scattering of soil, sand, stone chips or even some emulsified asphalts will then aid germination. Mulching with a layer of hay, straw or other organic litter aids in control of soil erosion before the plants are established, conserves surface moisture, and has numerous other benefits for the culture of grasses, particularly where they are sown on subsoils.

With these departures from customary practice proving successful, the next interest lies in doing this work by machine methods. Although several



MULCH AND EVENTUAL GRASS ALONG A HIGHWAY

Left: Oat straw has been applied to the seeded subsoil at the rate of one ton per acre, and it is held in place with shovelsful of earth of one-quarter inch average depth. *Right*: A close view of the grass shown on a preceding page, as it appeared in May, after a September sowing which was made on the exposed bank without the addition of topsoil.

mechanical methods of seeding have been tried, the most promising appears to be the use of water pressure. A tank having agitator paddles is filled with water. To this is added lime, fertilizer and grass seed. The mixture is ejected by a small centrifugal pump and sprayed through a fire hose. The spray is delivered quite uniformly at a distance 50 to 75 feet from a moving vehicle and the fertilizing and seeding of an acre of ground then becomes a relatively short time job. A successful method of applying a mulch of hay or straw has been with an ensilage blower. These are primitive tools but they are undoubtedly the forerunners of much more efficient ones.

In many instances rate of seeding has been reduced from a customary 200 to 300 pounds per acre to about 60 and it may prove successful at 30 pounds or less. The saving in cost of applying the lime and fertilizer in one operation appears to outweigh the loss of released nitrogen from the fertilizer as previously supposed. The seeding seems to be sufficiently successful if combined with mulching so that it may be done on any day of the calendar year, regardless of wind, drought or frozen ground. Small rates of cereal grains sown before or with the permanent grasses often supplement the benefits of the dry organic mulch, help hold the mulch in place and sometimes replace it all together as a living mulch.

The next important problem centers on plant foods. On many soils it appears best to use a mixed commercial fertilizer in the proportion of 10 units of nitrogen, 6 of phosphorus and 4 of potassium at the time of sowing and using rates of application based on the nitrogen content. The nitrogen carriers would contain about 30% in the form of nitrate nitrogen for prompt availability. Fifty to 75 pounds of nitrogen per acre are considered a good average. Thus 500 to 750 pounds of a 10-6-4 fertilizer would be used for an acre at the time of seeding to get the grass started. For the next two or three years about half this amount of nitrogen alone would be used each year to bring the turf along. Subsequent maintenance fertilizing would depend upon the results. It is surprising to see how soon a dense sod can be created by this method and the inches of topsoil which are produced in place due in large measure to the millions of roots sloughed off each year from the thrifty plants.

These findings are preliminary and not conclusive. They have, however, been successfully used in a considerable range of soils and climatic zones and they at least indicate a trend which promises to benefit parks, cemeteries, golf courses and perhaps the owner of the home lawn also.

It is pleasant to anticipate a saving in buying topsoil and avoiding the weary chore of pushing a lawn mower back and forth and back and forth, and then doing it all over again. The use of chemical herbicides to reduce the weed population and perhaps to retard the growth of grass and minimize mowing are other possibilities which may prove practical.

Varieties of Conifers—II

How New Types Originate

By Henry Teuscher
Curator, Montreal Botanical Garden

(This is the conclusion of the address given at the dedication of the Montgomery Conifer Collection.)

THE large majority of all abnormal varieties of conifers, dwarf as well as weeping and fastigiate and others, originate as mutants, or changelings, which happened because one of several possible outside influences caused a realignment of their genes within the seed or possibly even earlier in the ovum or the pollen. One might look upon this process as nature's way of throwing the dice in the hope of coming up with a winner. A winner in nature is, of course, a type of organism which is better fitted than its brother for the fight for survival. Nature is ruthless. Any new type not able to hold its own in competition with established plants is doomed to an early death. It requires many throws of the dice to produce such a winner, and a conifer collection offers good opportunities for observations of the superior — and occasionally inferior — forms.

One type which turned out to be a winner, but which few people would recognize as such, is the prostrate balsam fir, *Abies balsamea* var. *hudsonia,* which was found in the wild in New Hampshire near timberline. That under the severe climatic conditions of the timberline a prostrate habit is of definite advantage needs no emphasis. To avoid misunderstanding, it may be stated that the majority of timberline dwarfs are not mutants but are simply the result of adverse conditions which prevented normal development. When such dwarfs are removed to a more favorable environment, they develop into trees. *Abies balsamea hudsonia* does not, however, and it must be assumed that in a timberline population of dwarfs a certain percentage of dwarf mutants is apt to be present. The trouble is merely that it is difficult to recognize them as such.

That many other dwarfs which happen to occur under normal forest conditions are undoubtedly smothered early by more vigorous upright growing types, is apparent from the fact that, while they appear not infrequently in nursery plantings, rather few are ever found in nature. Some of the dwarf conifers seem to be sterile — at least they are not known to have fruited — while others do produce seeds quite freely when they reach maturity. The fact that such mutants do come true from seeds, provided, of course, that cross-fertilization with normal trees of the same species is prevented, is very little known. The reason that this is not observed generally is that conifers are wind pollinated and that

cross-fertilization is the rule rather than the exception, if no precautions are taken. Besides, it seems — though as yet there is no definite proof — that in such cross-fertilization the dwarfism character is suppressed. It would be extremely desirable to carry out systematic research to clear up this truly intriguing point.

An interesting example of what is sometimes termed a "climatic dwarf" is represented by the grafted plant of *Picea glauca* var. *parva* which is included in the Montgomery collection. This variety was described from plants in the Ungava region of Newfoundland and northern Quebec, which lately has received a great deal of publicity because of the rich iron ore deposits discovered there. Considerable areas of this desolate and windswept northern country, with conditions between taiga and tundra, very similar to the timberline, are covered with scrubby spruce, especially *Picea glauca,* but also *P. mariana* as well as *Larix laricina.* All of these are dwarfed; in fact, a dwarf variety of *Picea mariana* and one of *Larix laricina* have been described from there. There is little doubt that mutants must be among these sometimes completely prostrate trees, but which of them are mutants or whether in certain spots perhaps a true mutant dwarf population has developed, has not been established so far.

This spring at the Montreal Botanical Garden we have sown seeds of *Picea glauca parva* and of *Larix laricina prostrata* which were collected in the Ungava region and on the mountainous Gaspé peninsula, and it will certainly be very interesting to watch the plants which we hope to obtain. Will they be dwarf or normal or mixed? The results may throw light on the general puzzle, though they cannot solve it, for much more work will yet have to be done before the question can be cleared up entirely.

The grafted plant of *Picea glauca parva* in the Montgomery collection is much taller than this variety ever grows in its native habitat. Actually it represents a somewhat stunted tree. Whether this is the result of additional vigor imparted to the dwarf scion by the normal seedling stock, or whether the plant from which the scion was taken was not a true dwarf, is open to dispute. A number of instances have been reported where the grafting of dwarfs on normal stock had the effect of causing the development of an upright leader with the result that they became more or less treelike.

It has yet to be mentioned that some — though fewer than is generally believed — of the ornamental dwarf conifers originated as so-called witches' brooms: dense abnormal growth, appearing on branches of otherwise normal trees. The term "witches' broom" is somewhat unfortunate, because it lumps together at least two very different phenomena. One is the witches' broom caused by parasitic fungi, especially rust fungi. The

mycelia of the fungi penetrate nearly all parts of the abnormal growth which is the symptom of disease. No ornamental dwarfs are known to have originated from this type of witches' broom and there is small likelihood that they ever will.

Occasionally, however, something else happens and abnormal shoots appear giving rise to developments resembling a witches' broom apparently without any causative agent. The most logical explanation which has been advanced is that these represent bud mutations. As everyone knows, such bud mutations — or sports, as the gardener calls them — occur not infrequently on all kinds of plants. For instance, one branch of a white-flowered rose may produce pink flowers, or white flowers may appear on a branch of a yellow chrysanthemum, etc. Such dwarf branch sports of conifers may be upright or drooping and can be maintained through propagation by cuttings. There have been reports that in some instances mutant witches' brooms of this type have fruited while still on the parent plant and that the seedlings raised from such seeds were dwarfs. This is not only possible but to be expected, since the change in chromosome composition — whatever caused it — is constant and hereditary. Cross-fertilization with normal plants or a new mutation causing reversion to type are the only two influences which might result in further changes. Until we actually learn to control mutation, which in spite of all recent discoveries we are still far from being able to do, we shall remain at the mercy of nature and will have to depend on chance.

We have seen that a dwarf or prostrate habit may under certain climatic conditions represent an advantage. A moderate weeping habit, especially of secondary branches, may be advantageous also, since it serves as a protection against snow damage. The weeping Serbian spruce, *Picea omorika serbica* — sometimes called var. *pendula* — which is represented in the Montgomery collection, is such a type. This actually is a geographical variety, distinguished by short main branches and weeping secondary branches, and it represents a mutant which definitely established itself as a winner in the fight for survival.

Four abnormal forms of the Norway spruce, *Picea Abies*, may yet be mentioned, since they are not frequently seen together. These are the varieties *virgata, viminalis, reflexa* and *pendula major*. The variety *virgata,* by the way, has been found not infrequently in forests in Norway, where occasionally even larger groups of it have been observed, proving therewith that it comes true to type from seed.

These four types should be interesting especially to the geneticist, since they may be considered as progressive steps in mutation more or less in the same direction. Though this mutation leads to a dead end and, certainly, is of no direct practical value, its genetical investigation offers the possibility of shedding additional light on the linkage of genes

within the chromosomes. In this manner the future study of these rather unlovely odd types may yet result in findings of considerable practical importance.

This suggestion is advanced here in order to emphasize the fact that the gathering together of abnormal varieties in an arboretum or pinetum should not be regarded as a useless collection of oddities. To determine which of them might be useful in landscape gardening is only one, and not the most important one, of the functions of such a collection.

Mimosa Wilt Found in New Jersey

By P. P. Pirone

THE mimosa or silktree (*Albizzia julibrissin*), widely planted in the South as an ornamental tree, is subject to a highly destructive fungus disease which wilts and finally kills infected trees. The disease has been known since 1930 and its causal agent, the fungus *Fusarium oxysporum* f. *perniciosum,* since 1935. It is now known to occur from Maryland to Georgia. Presence of the fungus in the tree is shown by darkening of the sapwood.

The northernmost point of its occurrence up to 1949 was Silver Springs, Maryland. In July this year the author isolated the fungus from a diseased tree located at Cape May, New Jersey. Although this new location is no farther north than Silver Springs, it is nearly 100 miles eastward, thus greatly extending its present range. Moreover, this is the first report of its occurrence in New Jersey.

Diseased branches and chips of wood from a Cape May tree were submitted to The New York Botanical Garden in July by Mr. Winston Parker, a landscape forester of Moorestown, New Jersey. Mr. Parker noted severe wilting in the mimosa tree on the property of one of his clients.

His material was subjected to the standard laboratory procedure for isolating fungi in wood, and within three days pure cultures of a fungus were obtained. The fungus was also isolated from small branches which showed no browning of the sapwood.

EFFECTS OF WILT DISEASE ON ALBIZZIA JULIBRISSIN

(On the opposite page)

Above: A normal branch of a mimosa tree. *Below*: Part of a diseased tree showing wilted foliage, the first external symptom of the disease. Photographs by George H. Hepting, U. S. Department of Agriculture.

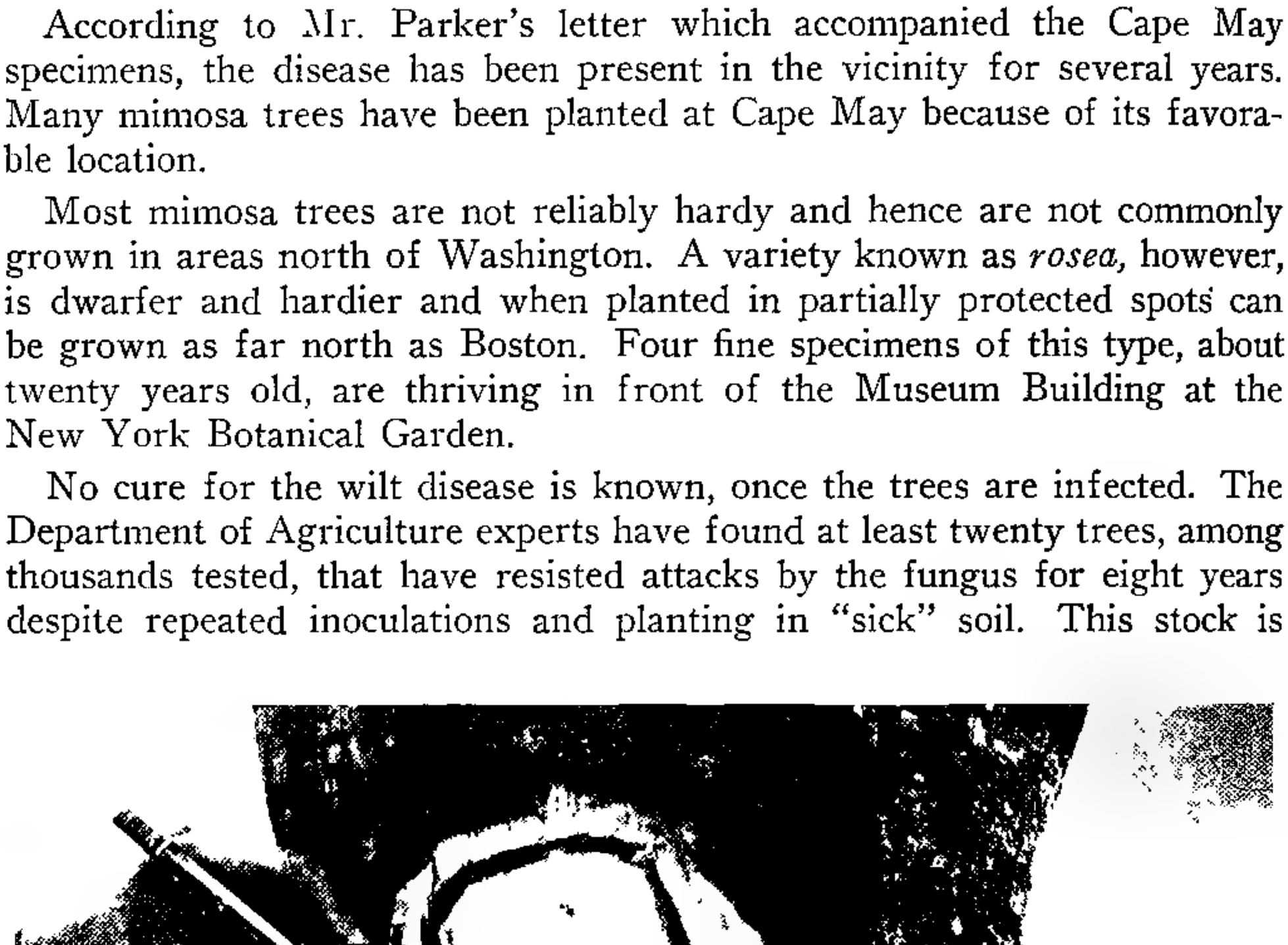
EFFECTS OF WILT DISEASE ON ALBIZZIA JULIBRISSIN

Cultures of the fungus were then sent to Dr. E. Richard Toole of the United States Department of Agriculture, Asheville, North Carolina station, who, with Dr. George Hepting of the same station, is an authority on this disease. After studying the cultures submitted, Dr. Toole confirmed the diagnosis that the fungus *Fusarium oxysporum* f. *perniciosum* was responsible for the disease at Cape May.

According to Mr. Parker's letter which accompanied the Cape May specimens, the disease has been present in the vicinity for several years. Many mimosa trees have been planted at Cape May because of its favorable location.

Most mimosa trees are not reliably hardy and hence are not commonly grown in areas north of Washington. A variety known as *rosea,* however, is dwarfer and hardier and when planted in partially protected spots can be grown as far north as Boston. Four fine specimens of this type, about twenty years old, are thriving in front of the Museum Building at the New York Botanical Garden.

No cure for the wilt disease is known, once the trees are infected. The Department of Agriculture experts have found at least twenty trees, among thousands tested, that have resisted attacks by the fungus for eight years despite repeated inoculations and planting in "sick" soil. This stock is



INTERNAL SYMPTOM OF MIMOSA WILT

The dark ring in the outer sapwood of the trunk is the characteristic mark of a tree doomed by the fungus *Fusarium oxysporum* f. *perniciosum.* Photograph by E. R. Toole, U. S. Department of Agriculture.

MIMOSA TREES AT THE NEW YORK BOTANICAL GARDEN

These fine specimens of the hardy variety *rosea* stand to the right of the main entrance to the Museum Building.

being increased in the Department's nursery at Tryon, North Carolina, and it is hoped that in a few years resistant trees will be available through commercial channels.

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NOTE: For more details on mimosa wilt see U.S.D.A. Circular 535 "A vascular wilt of the mimosa tree" by George H. Hepting, and *Trees* magazine, Vol. 9, No. 4, 1949, "Selection and propagation of wilt-resistant mimosa trees" by E. Richard Toole.

Salt-Rising Bread

A Study of its Origin and Nature, and of the Microorganisms Which Make it Rise, With a Tested Recipe

By Christine Chapman Robbins

WHEN as a bride of a few months I moved, in 1916, to Alabama, I realized for the first time how different the food habits of the South were from those of my native New England.

Amongst the favored dishes in our home were red flannel hash, baked Indian pudding and pumpkin pie. Boston brown bread always accompanied baked beans. Johnnycake made from the yellowest of corn meal was the usual hot bread and was often served as "gems." Light Parker House rolls were for special occasions while high-piled loaves of homemade bread were sliced at the table at every meal.

My Alabama neighbors had little regard for many of our favorites. I, in turn, have never developed a liking for hominy grits. Corncakes, fashioned from powder-fine white corn meal, and soda biscuits were their quick breads. Company fare was beaten biscuits. A local product, salt-rising bread, which was sold in the stores and made in the home, was a type entirely new to me.

I accepted salt-rising bread with mixed feelings. It was sold in a small flat-topped loaf with a smooth dark crust. It sliced well. The crumb was white and fine-textured, and it toasted a beautiful even brown. But it had an unpleasant odor, especially when heated, and a distinctive flavor. Some describe the unique flavor as that of mild cheese, while others call it nutty. Odor or no odor, I came to find the unique flavor of salt-rising bread decidedly palatable, and can understand how those addicted to it long for it and find yeast bread comparatively tasteless.

When I moved to Missouri a few years later, I again encountered salt-rising bread. I felt fairly competent to make yeast bread but had never attempted this new type. What is salt-rising bread? How is it made? How does it differ in preparation from yeast-raised bread my mother made and taught her daughters to make? These questions interested me. Off and on for many years I have sought the answers.

I consulted with housewives who were expert in making salt-rising bread. I read the reports of investigators on the subject. I advised with women transplanted to the East who were attempting to make salt-rising bread in their new homes since they were unable to buy it for their displaced husbands. As a result of knowledge culled from these sources and by trial and error in making the bread itself, I have found the answers to some of my questions.

The first directions I had for making salt-rising bread were from a neighbor in Columbia, Missouri, Miss Addie Whitlow. Miss Addie, who was seventy, was one of the most friendly and well-balanced women I have ever known, negating the traditional characteristics of a spinster. She made the bread as it had been made in her Kentucky home before the Civil War. I give her recipe exactly as she gave it to me. It may be the same one used just after the war between the States by the housewife in Kentucky described in "Drivin' Woman" by Elizabeth Chevalier. Miss Addie's recipe:

"Take one-half teacup of sweet milk; let it come to boiling heat; then stir in corn meal to the consistency of mush; let it stand in a warm place over night, then make a stiff batter of flour and warm water or milk; add the meal, a pinch of sugar and a teaspoon of salt; stand in warm water until it rises; don't have the water too warm; make your bread of the rising and warm milk (or water), tablespoon of lard, and a little salt. I always take the same quantity of milk as rising; work well, and then mold in pans. Don't bake in a very hot oven."

Miss Addie could make excellent salt-rising bread. I was not so fortunate. Sometimes the corn meal mixture which stood overnight showed no sign of rising and had to be discarded; sometimes the rising was active but the dough in the pans failed to rise. Occasionally the flavor of the bread was not all that was desired.

This recipe, like many others I have tried to follow, was too indefinite and failed to stress the critical steps. I did not have Miss Addie's long experience in familiar surroundings in following an empirical formula. It has taken me some years to learn which are the critical moments in making salt-rising bread.

Importance of Temperature

During this period I have collected some dozen or more recipes[1]. In general, the process of making the bread was considered in three steps: 1) preparation of a rising or starter; 2) preparation of a batter or sponge to which the rising is added; 3) preparation of dough and loaves.

The details, however, varied. Some called for mixing the corn meal of the starter with scalded milk, some with boiling milk; some called for the addition of salt to the starter, some recommended adding salt and bicarbonate of soda to the corn meal; a few call for sugar in the rising. Most bread makers considered that you got a better starter from the less highly purified corn meals.

The place where all agreed was in the matter of temperature. I was told to "wrap up the starter as if it were a baby," "never let your starter

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[1] Farmer's Bulletin, U. S. Dept. of Agriculture No. 1775, 1937.
Gourmet magazine, December 1944, p. 75.
"Bread Tray" by De Gouy (1944) contains recipes for salt-rising bread with definite directions for temperature control.
H. A. Kohman has prepared directions for commercial use.

cool off," "warm the flour before adding to the batter," "make a lot of starter, keep it warm; it'll start a working and fill your pan." One woman claimed she kept her mixture under the bed on winter nights to keep it out of drafts.

After considerable experimentation, in which my family sympathetically served as testers and tasters, I found, as my advisers emphasized, that temperature is important. In fact, the difference in the temperature treatment for salt-rising bread and yeast-raised bread is so great that one accustomed to making the latter may easily fail with the former unless directions for temperature control are carefully observed.

A Reliable Recipe

I have found that the following directions give uniform results when making salt-rising bread in the home.

Preparation of Starter: Heat 1 cup of milk until boiling well. Stir into the milk ½ cup corn meal. (I have tried various corn meals and have secured activity with all, but I believe the water-ground white meal has given quicker results.) Place the prepared corn meal, which should be only moderately stiff, in a jar. A wide-mouthed fruit jar holding between 3 and 4 cups is adequate. Cover the jar loosely and place in a pan of water, hot to the hand. Wrap the whole up very well in a towel and place where the water in the water bath can be kept hot for from 6 to 10 hours. In the winter I place the jar on top of my oil burner at 10 o'clock at night. If cool in the morning, the corn meal can be reheated by adding a small amount of boiling milk, the water bath renewed, and the whole placed in an oven, preheated to 100 - 115°F. About noon or 1 P.M. it shows a "lightening," an elevation of the mass in the jar. Suddenly the mass is full of bubbles and you hear the escaping gas. It is now ready to add to the sponge.

Preparation of Sponge: Take two cups of milk hot as the hand can bear. Place in a warmed mixing bowl. Add 2 to 3 cups of warmed flour (bread or all-purpose). Stir until well mixed. Add the prepared starter, mix well with a flexible spatula or spoon. Cover the bowl, place in a pan of water at about body temperature. Wrap well and place to rise at the same temperature as for the starter. This should rise in 1 hour to 1½ hours. Watch and try to catch it just as it begins to drop a bit. Then use in preparing the dough.

Preparation of Dough: In preparing the dough and loaves I work on the top of the warmed oven and keep all the materials warm in the oven. The temperature of the dough should not be allowed to drop during its preparation. I usually prepare only 2 large loaves or 4 half-sized loaves at one time. If the sponge is very active you can make more.

Add 2 tablespoons of sugar, 1 tablespoon of salt, 1 tablespoon Crisco (or other hydrogenated shortening). Add sponge and flour to make a soft dough. In kneading, stretch and fold the dough 10 to 12 times in the hands or on the board. Mold into loaves. Double loaves are best as salt-rising loaves tend to split on the side. Use small deep pans or a square pan for double loaves. Set again to rise at 100 - 115°F. until double in bulk or until at top of pan. This usually takes 1 to 2 hours. Bake at 385° for 10 minutes, then lower temperature to 350°.

Where Did It Originate?

I have been unable to discover where the method of making salt-rising bread originated. Corn meal is the chief ingredient of the starter, so we may assume it is indigenous to the New World. In a country where corn meal was plentiful it may have been used in imitation of the European

method of preparing a starter by the natural fermentation of a batter of flour and water[2]. It is quite obvious that some means of securing a spontaneous fermentation was essential in the early days of this country when families were isolated and it was difficult or impossible to maintain or to borrow yeast or a yeast starter. Why it was called "salt-rising" is not clear, since salt may be omitted without affecting the result[3]. It has been suggested that lack of knowledge of chemistry and the role of micro-organisms in fermentation led early housewives to consider the addition of a teaspoon of salt to take the place of yeast or baking soda.

What Makes It Rise?

Salt-rising bread has been the subject of a number of technical investigations, one of the major purposes being to discover the cause of the formation of the gas which makes the bread rise.

In yeast-raised bread sugar is decomposed by the yeast plant mainly into alcohol and carbon dioxide. The gaseous carbon dioxide caught in the glutinous dough causes the bread to rise. Kneading works some gas out of the dough and breaking up the larger gas bubbles gives a finer grain to the loaf. If the flour does not contain enough gluten to make a sufficiently tenacious dough, the gas escapes and the bread does not rise well.

The second product of yeast action, alcohol, is driven off into the air as the bread bakes. These are elementary facts regarding yeast-raised bread. They are important to recall here because of our interest in the question, "What makes salt-rising bread rise?"

Since experience has shown that salt is neither effective nor essential, some bacteriologists have been of the opinion that yeasts present in the corn meal, or accidentally added in the handling, produce the gas which raises the dough, while bacteria of several kinds, the development of which is encouraged by the use of corn meal in the starter, give the characteristic flavor to the bread.

It seems clear, however, from several investigations which will not be cited here, that yeasts have nothing to do with gas production in salt-rising bread. Bacteria, which are microscopic plants just as yeast is, though quite distinct from yeast, are the responsible agents. The changes which these bacteria produce in some of the constituents of the bread determine its flavor. Since some of these digest gluten, changing it into less mucilaginous

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[2] Boutrous, L. "Le Pain et la Panification," Encyclopédie de Chimie Industrielle (1897):

"The Greeks and Romans made use of leaven which they prepared by making batter of bran and fermenting wine. This they dried in the sun. For use they dissolved a piece in water and mixed it with the flour."

[3] The erroneous impression that "salt-rising bread is quite free from acidity, since the presence of salt prevents undesirable fermentation," was expressed by Emil Braun in "The Baker's Book" (1903). A similar conception was expressed by Atwater, U. S. Department of Agriculture, Farmer's Bulletin, 389.

substances, the dough of salt-rising bread is less stiff than that made with yeast and the crumb is shorter and more friable.

Salt-rising dough does not have the elasticity of well-kneaded yeast dough; in fact, the elasticity decreases as manipulation and fermentation proceed. Salt-rising fermentation is extremely sensitive. The gas-producing function of the bacteria reaches an optimum of activity and then decreases rapidly, causing a loss of gas and marked mobility or "flowing" of the dough. The proofing time must be very carefully watched so that the fermentation may not have passed its optimum before the dough is in the pans or ready for the oven.

This so-called "slackness" of the dough makes it more difficult to handle, as it will not form an elastic ball as yeast dough does, but tends to spread on the kneading board and in the pans. It takes the shape of the pan and if allowed to rise above its edge will tend to spread over the side instead of forming a piled loaf.

Salt-rising dough or starter cannot be kept over as the rising for a subsequent baking, as can yeast-raised dough, because of these characteristics of the fermentation. Salt-rising bread must be made from fresh materials each time.

It appears then that salt-rising bread is as it is because of the development of gas-forming bacteria, the growth of which determines its rising, its flavor, and its consistency. It differs in these respects from yeast-raised bread since the growth of yeast gives a different set of characteristics. In each we need to supply optimum conditions for growth of the particular microorganisms concerned.

The Bacteria Principally Concerned

What is the nature of the bacteria important in the fermentation of salt-rising dough?

Kohman, who has patented a leaven to be used commercially in making salt-rising bread (U. S. Patent No. 1,149,839. 1915), believes that the source of the bacteria is not the air nor the utensils used but the corn meal of the starter, a belief which contradicts a commonly held view that there is less likelihood of failure in salt-rising fermentation where the air of the rooms and the utensils contain desirable organisms.

The bacterial flora associated with corn meal and other farinaceous materials varies greatly. The temperature at which the starter is prepared will have much to do with the kinds of bacteria which develop and the quality of the bread made with it. According to Kohman, at temperatures below 75° C. (167° F.) the corn meal was found to contain aerobic non-spore formers which could produce the bread successfully. *Escherichia coli* (*Bacillus coli*), which was isolated at a temperature below 65° C. was never found at a temperature of 75° C. or higher. Where the liquid used

in making the starter was hot enough to bring the temperature of the batter to 75° C. (167° F.) or more, certain anaerobic spore-bearing organisms prevailed which readily produced the gas necessary to raise the bread. Kohman believes that the most desirable bread, in texture and flavor, is produced when the starter is set at 85° to 90° C. (185° to 195° F.).

One of the leavening agents, at this higher temperature, was thought by Koser to be *Clostridium welchii.* This organism occurs frequently in milk, is undoubtedly consumed in other raw foods, and is commonly found in the intestinal tract. Although a pathogenic anaerobe, it seems not to be harmful when taken by mouth[4].

Recent unpublished work by Spray suggests that no single organism is the sole agent responsible for salt-rising bread fermentation but that it may be due to the symbiotic action of two organisms: *Clostridium perfringens* and *Clostridium tertium*[5].

The final word may not yet be available as to the exact nature and cultural characteristics of the organism or organisms involved.

Characteristics as a Staple Food

Salt-rising bread, because of its bacterial fermentation, possesses features making it an interesting contrast to the many well-known doughs prepared by yeast fermentation.

It also has merits as a food. The bread is fine-grained, has a small crumb, and is friable. Many of its adherents claim it has greater digestibility than yeast-raised bread. As a bread of distinctive flavor it offers welcome variety to the usual white loaf.

Most advocates of whole wheat bread, even ardent ones, at times appreciate change and variety in the diet. I have made salt-rising bread with whole wheat flour, too, and find it to be of good flavor and texture.

Bread is our staple food, also a low cost food in terms of nutritional value. Where money does not have to be too carefully considered, we can feed corn to hogs and cattle and enjoy it in the form of meat. However, it takes a lot of grain to feed a pig and the return in calories is about one-third that where the grain itself is used. Meat plays a small part in low cost diets which depend so largely on cereal grains and are commonly monotonous.

One of the best ways to add the necessary variety and increase the nutritive value of restricted diets is to encourage the making and consumption of bread of high quality. Salt-rising bread might well be more widely used as one more nutritious food.

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[4] Tanner, Fred Wilbur. Microbiology of Foods. 2nd edition, 1944.

[5] Reference by permission of Prof. R. S. Spray and H. A. Kohman.

NOTICES AND REVIEWS OF RECENT BOOKS

Biography of the Dean Of American Horticulturists

LIBERTY HYDE BAILEY. A Story of American Plant Sciences. Andrew Denny Rodgers III. 506 pages, illustrated, indexed. Princeton University Press, Princeton, N. J. 1949. $7.50.

Perhaps it was unfair to subject this biography—the third in a series on American botanists—to the ordeal of review by one who has known its subject for more than 40 years, studied under him, been inspired and helped by his works and words, who holds him in greater admiration than any other man living. To me, the book is both exasperating and deeply gratifying. Exasperating at times because it is actually two books in one (as indicated by the title and sub-title even if not so planned); and because, throughout so much of it, the "second book"—that is, the broad historical discussion of many people, institutions, and incidents—interrupts and obscures the "first book," and distracts the reader from a continuous, intimate narrative of the amazing life of Dr. Liberty Hyde Bailey. Even though he is introduced on the first page (appropriately enough in connection with his father's Michigan apple orchard); even though the last three of the 484 pages are given over to one of his timeless philosophic poems; even though the influence of his remarkable personality, mentality, and vision on men, motives, and events makes itself apparent over and over again -nevertheless, this reviewer found himself involuntarily resenting the many digressions and detours encountered, especially in the first half of the volume. Later they become fewer; the last four chapters read more easily; one's attention and interest are held more and more closely as the story converges more completely upon its real character.

Not that the digressions are uninteresting, or do not constitute a valuable illuminating record of developments of which all horticulturists can be proud, and about which more of us should know. They do, and the work has been done with accuracy, care, and attention to detail. But the historical material *is* so scholarly, comprehensive, detailed, that one is tempted to skip worthy pages in search of more about the man who was so largely responsible for much that has taken place during the last 60 years in the fields of agriculture, country life, botany, horticulture, gardening, nature study, and the teaching of all those subjects.

To strike a less critical note, this reader's gratification came with the gradual building up of a fine biographical portrait which becomes increasingly impressive. True, it is impersonal and reserved—therein reflecting the modesty and simplicity of its subject. But that is probably inevitable. Could anyone present, second-hand and in writing, a true and complete picture of Dr. Bailey as he is to those who have known and worked with him? Probably that is why some of the most rewarding and satisfying parts of the book are the numerous excerpts from Dr. Bailey's letters and addresses, and especially Chapter IX, which consists in generous measure of quotations from his book, "The Holy Earth."

These comments, then, are not intended as criticism of the task Mr. Rodgers undertook, or of the admirable, conscientious way he has discharged it. He has recorded remarkable, highly significant developments that have had tremendous impact upon this nation and its people, and upon the knowledge, cultivation, and appreciation of plants throughout the world; developments that have taken place within the lifetime of many of us, and that needed to be recounted in orderly manner for the information and guidance of this and future generations. They include the infancy of agricultural colleges and experiment stations, the beginnings of extension work, nature study, many branches of horticultural research, a new outlook on rural life and the relation of man to the land. Tribute is deservedly paid to many who might otherwise have been lost sight of except by those lucky enough to have come within their fields of activity. And the tales of how great institutions and movements have been conceived, come into existence, and become factors of vast usefulness in American

Wayside Gardens

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horticulture and American life, are good to read and to think about.

What I found lacking, then, is that which, I suppose, no book could be expected to provide—the thrill and rich experience of actually knowing, in person, the man who, last May, two months after his 91st birthday, ended a treasured letter to this writer with these words: "Age does not yet hang heavily on my neck and the world still is beautiful."

With that reservation, let me commend and thank Mr. Rodgers for a big job, well done.

E. L. D. SEYMOUR,
Horticultural Editor,
The American Home.

2,800 Selected Woody Plants For Ornamental Use

SHRUBS AND VINES FOR AMERICAN GARDENS. Donald Wyman. 442 pages, illustrated, indexed. Macmillan, New York. 1949. $7.50.

Dr. Wyman's latest book, like its predecessors, will be of great value to keen gardeners in the United States and Canada. It has excellent illustrations, including well drawn sketches, and contains much information arranged under headings devised to answer the questions of practical horticulturists—data on woody plants which in many other treatments have to be uncovered bit by bit, if they are to be found at all.

Prefacing his introduction with the heartening assertion that "More varieties of plants are available for the use of American gardeners than ever before in the history of this country," Dr. Wyman states a vigorous case for selecting the best of these plants and not bothering much about the mediocre ones. Succeeding chapters treat Hardiness, Order of Bloom, Ornamental Fruits, Foliage Colors, and Shrubs for Various Purposes—all offering impressively documented and expertly assembled information as well as plant lists in great abundance. The longest section in the book is the General List of Recommended Plants, comprising 265 pages of valuable notes on 1,100 species and varieties of shrubs and vines of particular merit as ornamentals. Dr. Wyman confesses that the selection of these has been somewhat arbitrary, but it is difficult to think of anyone whose opinion on the plants concerned should carry more weight. His years as Horticulturist at Harvard's Arnold Arboretum, following work in ornamental horticulture at Cornell University, give authority to his selections.

A secondary list contains over 1,700 plants which have been relegated to a subordinate place in Dr. Wyman's selections, and it contains impressive potentialities for improving landscape plantings of all types. It is something of a shock to find many old favorites proscribed here—*Cotoneaster adpressa, Dirca palustris, Itea virginica,* and, alas! *Stewartia ovata* (for a good proportion of plants sold as the type turn out to be the cherished variety with purple filaments).

Chapters on Vines and Bamboos are included, and a most valuable one, Naming Horticultural Varieties, has this vexing question succinctly set forth.

In a work sure to be a standard for many years, it would have been desirable to include, with the notes about achievements of workers at the Arnold Arboretum, such additional information as Miss Elizabeth White's and Dr. Frederick Coville's unique contributions in the cultivated blueberries, and the recent discovery of Mr. William Smith of Lyndonville, New York, in elders (which was passed on to the institution at Boston). Nevertheless, this skillfully prepared book holds unique possibilities for improving the appearance of the American garden.

B. C. BLACKBURN,
Gladstone, N. J.

Out of the Compost Pile

THE HEALTHY HUNZAS. J. I. Rodale. 263 pages, illustrations, bibliography. Rodale Press, Emmaus, Pa. 1948. $2.75.

Using the Hunzas, a tribe located in northwest India, J. I. Rodale has tried to prove that the excellent health this tribe is said to enjoy is due to the compost they use in raising crops. Surely this is stretching the point a long way. What is known about this tribe comes from the reports of British doctors who were stationed there and who marveled at their superb physique, cleanliness and freedom from the diseases that plague the rest of India. Their crops are raised on terraced hillsides up which they carry whatever organic matter is available. But they have few animals and they must have fuel for winter, and some things that might be converted to humus are used for fuel.

The fertility of their soils is apparently due largely to deposits of mineral-rich

earth annually carried down from the surrounding mountains and trapped in the terraces. Yet even here, despite their excellent crops, famine is not infrequent.

Though many travelers have sought the reason for the health of this unusual tribe, I doubt if it is to be found in the little pile of compost about which Rodale writes more in this book than he does about the Hunzas.

P. J. McKenna.

Practical Soil Management

FARM SOILS — THEIR MANAGEMENT AND FERTILIZATION. Edmund L. Worthen. 510 pages, illustrated, indexed. John Wiley & Sons, Inc., New York. Fourth edition, 1948. $3.

This well known textbook written by a capable and experienced teacher is designed for farmers and for students who are primarily concerned with the problem of practical soil management. Recommended practices have been brought up to date as the result of recent research work. The book is profusely illustrated and instructions are lucid and specific. Of interest to gardeners is the chapter on the management of garden, greenhouse and lawn soils with detailed instructions on tillage, fertilizing and composting.

Walter Thomas,
Pennsylvania State College.

Notes, News, and Comment

Index. Beginning with January 1949, articles apearing in the Journal of the New York Botanical Garden will be listed in the *Agricultural Index* published by H. W. Wilson & Co.

Mrs. John Ross Delafield. The Advisory Council lost one of its former members with the death of Mrs. John Ross Delafield of New York last May. Elected in November 1941, she remained a member until 1945. From January 1942 until her death she was a member of the Garden's Corporation. She had been a Life Member of the Garden since 1902, and her husband, who survives her, a Fellow for Life since 1945. Mrs. Delafield, in 1901 and 1902, contributed three articles on North American fungi to the Bulletin of the Torrey Botanical Club under her maiden name of Violetta S. White and until 1912 she was registered as an investigator in taxonomy at the New York Botanical Garden. Later she wrote extensively for the Bulletin of the Garden Club of America, and in recent years had done extensive research on early American botanical explorers.

Eleanor King. The author of the Garden's booklet, "Plants of the Holy Scriptures," Eleanor King, died at Lenox Hill Hospital in New York last July. She was Editor of the Audubon Magazine. Invited to write on the subject of Bible plants for the Garden's Journal of March 1941, Miss King based her article on the work of Dr. H. N. Moldenke, which was then published in mimeographed form. Her article was followed by a list of all plants mentioned in the Bible, with a passage selected from the quotations in Dr. Moldenke's work to accompany each one. More than 3,000 copies of this Journal were sold, and in 1948 the material was re-issued in booklet form. As a result of her original Journal article, Miss King wrote a book entitled "Bible Plants for American Gardens," which Macmillan published in 1941. With Wellmer Pessels

she was also the co-author of several children's books on insects.

Student Gardeners. Thirty-six former student gardeners met Aug. 2 at the New York Botanical Garden to discuss the possible renewal of the system under which they obtained their horticultural training, by re-establishing the school for gardeners at the Botanical Garden. A statement signed by the entire group was prepared for presentation to Dr. William J. Robbins and the Garden's Board of Managers.

Growth Conference. Dr. William J. Robbins presented a paper entitled "Some Factors Limiting Growth" before the Ninth Symposium of the Society for the Study of Development and Growth at Connecticut College Sept. 2. Five days later he spoke in Madison, Wisc., at the Centennial Symposium on Plant Growth Substances at the University on "Vitamin and Amino Acid Requirements for the Growth of Higher Plants." At the same meeting Dr. Robert S. de Ropp spoke on "Experimental Induction and Inhibition of Overgrowths in Plants."

Visitors. Summer months brought visitors to the Garden from many parts of the world. From Egypt came Dr. Elhamy A. M. Greiss, a plant anatomist on the faculty of science of Fouad I University at Giza. He was accompanied by Mrs. Greiss. From South Africa came Dora Weintraub, timber pathologist, who was spending some months in the United States investigating fungi which are destructive of mine props. Georg Ettisch, a former member of the Kaiser Wilhelm Institute, who has been teaching at the University of Kansas City during the past year, visited Dr. W. J. Robbins Aug. 1. Two weeks earlier, Miguel Mario Raggio of Montevideo, Argentina, spent a day at the Garden. Professor Claude W. Wardlaw of the University of Manchester, England, was a visitor Aug. 27.

At the conclusion of the U. N. Conservation conference at Lake Success in early September, two of the botanical delegates, Roger Heim and Théodore Monod, both from the Muséum National d'Histoire Naturelle, Paris, spent a day at the Garden. Earlier, from Lisbon, Portugal, came the Reverend José Carvalhaes, S.J.

Enroute to California, where she was to undertake studies in landscape architecture at the University in Berkeley, under a scholarship provided by the Hillsborough (Calif.) Garden Club, Elspeth M. Harris met staff members at the Garden Sept. 7. She is a former student at the University of Reading, England.

When Roy F. Wilcox of Montebello, Calif., came to the Garden July 18, a group of gardeners was assembled to hear him give an informal talk on his experiences as a nurseryman.

Selma Kojan, who has just received a Master's degree from Cincinnati, stopped at the Garden before leaving for Illinois, where she is undertaking graduate work in genetics.

Among other summer visitors were G. W. Martin, University of Iowa; Ernest Ball, North Carolina; Lewis Knudson, Cornell; R. A. Howard, Harvard; F. R. Fosberg, Catholic University of America; Maxwell S. Doty, Northwestern; Dow V. Baxter, University of Michigan; Richard Wood, Rhode Island State; Richard H. Fillmore, Propagator at the Arnold Arboretum; T. E. Boyd, National Foundation for Infantile Paralysis; H. K. Svenson, American Museum of Natural History; B. C. Blackburn, Gladstone, N. J.; Frank E. Egler, Norfolk, Conn.; Rupert C. Barneby, Wappingers Falls, N. Y.; Charles Thom, Port Jefferson, N. Y.; and Charles N. Frey, Director of Scientific Relations for Standard Brands, Inc.

Radio. Dr. H. N. Moldenke appeared on Alma Dettinger's program on WQXR Sept. 7 in an interview on "American Wild Flowers." G. L. Wittrock took part in a program over WNYC Sept. 20, speaking on courses and lectures at the Botanical Garden.

Judging Course. Forty women enrolled in a horticultural judging course offered by the Ninth District, Federated Garden Clubs of New York State, met for their fourth session in the Members' Room Sept. 15. After lectures given by James B. Jack and Arthur King on what to look for in judging summer annuals and perennials, they had a guided tour of the grounds.

Assistant Secretary. Dr. Donald P. Rogers was elected Assistant Secretary of the New York Botanical Garden at the annual meeting last May 26, not Assistant Treasurer, as was announced in the July Journal.

THE NEW YORK BOTANICAL GARDEN

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

Membership in
THE NEW YORK BOTANICAL GARDEN
and what it means

TO THE INSTITUTION, membership means support of a program that reaches several hundreds of thousands of persons annually.

Briefly, this program comprises (1) horticultural display, (2) education, (3) scientific research, and (4) botanical exploration. To further this work and to disseminate useful information about plant life to the public, the Garden issues books and periodicals, both scientific and popular, and presents lectures, programs, radio broadcasts, and courses of study in gardening and botany. The laboratories and large herbarium and library serve the staff in its research and educational work, while the extensive plantings at the Garden give the public vistas of beauty to enjoy the year around. The public is also free to use the Botanical Garden's library, and, under direction, to consult the herbarium.

TO THE INDIVIDUAL, membership means, beyond the personal gratification of aiding such a program, these privileges:

Free enrollment in courses up to the amount of the annual membership fee paid.

A subscription to the Journal (published monthly) and to Addisonia (issued irregularly).

Admission to Members' Day programs and use of the Members' Room also at other times.

A share of plants when made available for distribution. (These plants may include the Garden's new introductions into horticulture.)

Personal conferences with staff members, upon request, on problems related to botany and horticulture.

Free announcements of special displays, lectures, broadcasts, programs, and other events.

Use of lantern slides from the Garden's large collection, under established regulations for such loans.

A membership card which serves as identification at special functions at the Botanical Garden and also when visiting similar institutions in other cities.

* * * *

Garden clubs may become Affiliate Members of the New York Botanical Garden, and thus receive certain privileges for the club as a unit and others for individual members. Information on Garden Club Affiliation will be sent upon request.

Business firms may become Industrial Members of the New York Botanical Garden. Information on the classes of Industrial Membership and the privileges of membership will be sent upon request.

* * * *

Classes of membership in the New York Botanical Garden in addition to Industrial Memberships are:

	Annual Fee		*Single Contribution*
Annual Member	$ 10	Member for Life	$ 250
Sustaining Member	25	Fellow for Life	1,000
Garden Club Affiliation	25	Patron	5,000
Fellowship Member	100	Benefactor	25,000

Contributions to the Garden may be deducted from taxable incomes.

Contributions to the Garden are deductible in computing Federal and New York estate taxes.

A legally approved form of bequest is as follows:

I hereby bequeath to The New York Botanical Garden, incorporated under the Laws of New York, Chapter 285 *of* 1891, *the sum of*_____.

Gifts may be made subject to a reservation of income from the gift property for the benefit of the donor or any designated beneficiary during his or her lifetime.

All requests for further information should be addressed to The New York Botanical Garden, Bronx Park, New York 58, *N. Y.*

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

NOVEMBER

1949

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AND POTTERY

CHESTNUTS FOR
FUTURE BUILDERS

QUININE HISTORY

THE LATEST
IN BOOKS

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VOL. 50 NO. 599

ENTS $1.50 A YEAR

TURKISH BROCADED VELVET
FROM THE 16TH CENTURY

NOVEMBER EVENTS AT THE GARDEN

Free Saturday Programs

3 p.m. in the Lecture Hall

Nov. 5 ***Scottish Gardens and Their Surroundings*** — *Alice Chauncey*, Photographer and Lecturer

Nov. 12 ***A Conservation Lesson for New Yorkers*** — *Harold C. Kimball*, President, So. N. Y. Fish and Game Assoc.

Nov. 19 ***Packing Through the High Sierras*** — *William L. Poulson*, Adirondack Mountain Club

Nov. 26 ***Succulent Plants for Indoor Culture*** — *E. J. Alexander*, Associate Curator

Dec. 3 ***Plants and Birds in the Winter Garden*** — *Alfred E. Runk*, Ramsey, N. J

Saturday programs will be resumed Jan. 7.

Members' Day Program

The first Members' Day program of the autumn season has been scheduled for Thursday, Nov. 3, with Dr. Bassett Maguire showing his motion picture in color of his successful search for the blowgun bamboo, *Arundinaria Schomburgkii,* in a remote mountain area in Venezuela early this year.

Conservatory Displays

Indoor displays of flowering plants will commence in the Conservatory early in November, and will be on view from 10 a.m. to 4 p.m. daily.

Museum Exhibits

Sculptures of Grecian, Balinese, Javanese, and Japanese figures, with fibre-sculptured backgrounds in bas-relief, by Kathi Urbach are on display in the rotunda of the Museum Building during November. The use of fiber in creating raised designs is original with Miss Urbach. Among the backgrounds which she has created for this exhibit are a Japanese maple for the Japanese group and a grapevine for the Grecian figures.

The exhibit of chrysanthemum paintings by Wang Chi-Yuan, opened at the time of the Chrysanthemum Show, will be continued through the middle of November on the mezzanine. These will be followed immediately by photographs of Scottish and English gardens by Alice Chauncey, who will give the initial showing of them at the time of her lecture on November 5 in the lecture hall.

The Cover Picture

Velvet brocade in which the tulip motif is woven with silver metal yarn is shown in this example from the collection of Near Eastern textiles owned by the Metropolitan Museum of Art. The material was made in Turkey in the 16th century. Color reproductions of this and of the glazed plate shown on page 245 are available from the Museum.

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JOURNAL

of

THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 50 NOVEMBER 1949 NO. 599

The Tulip as a Motif In the Decorative Arts

By John Kent Tilton

DATING only from the sixteenth century, the tulip is a relative newcomer in the western horticultural world. Although it had long been known in eastern Europe, the political separation between the main continent and its appendage at the eastern end of the Mediterranean kept a wealth of the knowledge and culture of each section hidden from the other. By the time the tulip was first seen outside of its native regions and their immediate environs, it had already been developed into much the same perfection that we find in it today. Thus, when it was brought to western Europe, it seemed like an example of floral perfection miraculously sprung into being.

Gardens were not in a state of advanced development at the time, but cloisters and castles had their herbs and flowers, and it is evident that the tulip was not found among them.

Certainly the tulip is not in the famous "mille fleurs" tapestries of the Middle Ages in which the weavers delighted in introducing every species of flower known in their era. These tapestry designs were veritable repositories of flora for the naturalist to study. Not the remotest semblance of

About the Author

MR. TILTON is Director of the Scalamandré Museum of Textiles in New York, which provided an exhibit of rare historic and hand-made textiles depicting roses in their design for the New York Botanical Garden in March 1949. He is the author of "The Symbol of the Rose in Textile Design" published in American Fabrics magazine, issue number nine, 1949, and of numerous other articles and booklets on textiles and their patterns.

a tulip is to be seen in any of them, nor is it to be found in the old illuminated Gothic manuscripts. But once it was discovered by the western world, no flower has ever been so rapidly accepted as a choice garden specimen, nor has one ever traveled so far in so short a time, nor brought such high prices as the tulip. Its extensive use in design is coincident with its rapid adoption by horticulturists.

20th CENTURY TEXTILES WITH TULIP DESIGNS, FROM SCALAMANDRE

The wind-blown tulips at the left are treated in the modern manner in a 1948 design printed by the silk-screen process by Scalamandré. At the right is a silk lampas of L'Art Nouveau era at the beginning of the present century, showing highly stylized tulips done in the French manner. (Photographs of textiles from the Scalamandré Museum by George D. Cowdery)

We owe our gratitude for the tulip to Busbequius, the ambassador sent in 1554 by the Roman Emperor, Ferdinand I, of Austria, to the Sultan of Turkey. His keen observation and his interest in flowers caused him to mention it in his dispatches from Adrianople while enroute to his new post at Constantinople. He stated that he had seen in the Turkish gardens one of the strangest and most beautiful flowers that he had ever beheld. He described it as somewhat resembling the turban worn by the Turks which they called the "tulband" and for want of a more descriptive name, he called the flower the "tulipan" although to the Turks themselves it was known as the "lalé" or "lali." The name the Austrian ambassador gave it, however, remained, and the English at a later date abbreviated it to "tulip." Busbequius, in his enthusiasm for the new flower, hastened to acquire some seeds—or were they bulbs?—which he sent back home to Vienna as a gift to the emperor. As soon as the plants bloomed there were pressing requests for more, and the tulip has ever since been one of the most highly prized flowers of all time.

It is curious that this elusive flower seems to have been unheard of in nearby Persia up to the 16th century. From the time it made its sudden appearance in the far-famed gardens there, it also found its way into the decorative arts.

One of the popular forms of design used in the 16th century Turkish textiles was the introduction on the bold, large-scaled petals of their floral motifs, especially the carnation, minute floral patterns of an entirely different species from that of the main design. Among these flowers that were used to break the monotony of the wide flat surfaces we find the tulip. The Persians, at the same time, featured the tulip as a decorative motif on their highly colored and glazed faience. They were the first to give the tulip the symbolical meaning of love, thus letting it compete with the rose in romantic significance. They made the flowering season of the tulip an occasion of domestic rejoicing.

The next stopping place apparently was Germany, for the tulip was found being cultivated in Augsburg in 1559, and the Germans too succumbed to its beauty. Not long after its introduction we find it portrayed as a floral motif on the pottery of Saxony which was known as "tulip-ware." The German potters featured the tulip by scratching it in the surface of their earthenware.

When the Palatinate Germans immigrated to America and settled in Pennsylvania, they brought the tulip with them and incorporated it as a decorative floral motif with their handicrafts. It was extensively used in the slip and sgraffito decoration of their glazed earthenware. The slip ornament was an application of a different colored clay (dark brown or white) from the background, a process which raised the design above the surface. Sgraffito was a process of scratching the outline of the design into the surface. Both methods were frequently combined in the decoration of

a single piece. They also used the tulip in the painted decoration of their dower chests and door panels of cabinets. Requiring but little skill to draw the simple outlines of the petals, the tulip became the most popular motif in their peasant art.

Religious symbolical meaning had been given to various flowers long before the belated advent of the tulip, so it has little significance in religion. However, there are certain faiths among the Germans who adopted it as a holy lily, symbolic of the chalice, probably because of the cup-like formation of its perianth, and with these people three tulips also stood for the Holy Trinity.

It remained for Holland in the 17th century to abandon herself completely to the lure of the tulip. In about 1570 she had started cultivating the plant, which had in all probability entered the Low Countries by way of Germany. Between 1634 and 1637 there occurred one of those inexplainable get-rich-quick manias, when the staid and complacent Dutch lost their heads over tulips and the famous tulipomania took place. Prices for the precious bulbs suddenly skyrocketed out of all proportion to their actual market value. They were sold and resold while still in the ground at ever mounting prices. A story has been handed down that one enthusiast even sold his house for three choice tulip bulbs. The crash inevitably came, but tulips continued to be grown, until today the bulbs form one of the country's principal sources of income and the flower has become the national emblem of The Netherlands.

In the third quarter of the 17th century Holland was at the peak of her power, and the Dutch East India Company was carrying on a lucrative trade with China. The Dutch imported quantities of chinaware and in turn exported it to all of Western Europe. Specially decorated porcelain was made in China for the home consumption of the occidentals. The tulip motif was sent back by the Dutch merchants with orders for the Chinese artists to paint it on their porcelain as a floral decoration.

The much traveled flower reached England, then the outpost of the western world, around 1577. The tulip immediately became one of the most sought after flowers for gardens there, and continued so up to the early 18th century, when the British became intrigued with the new forms

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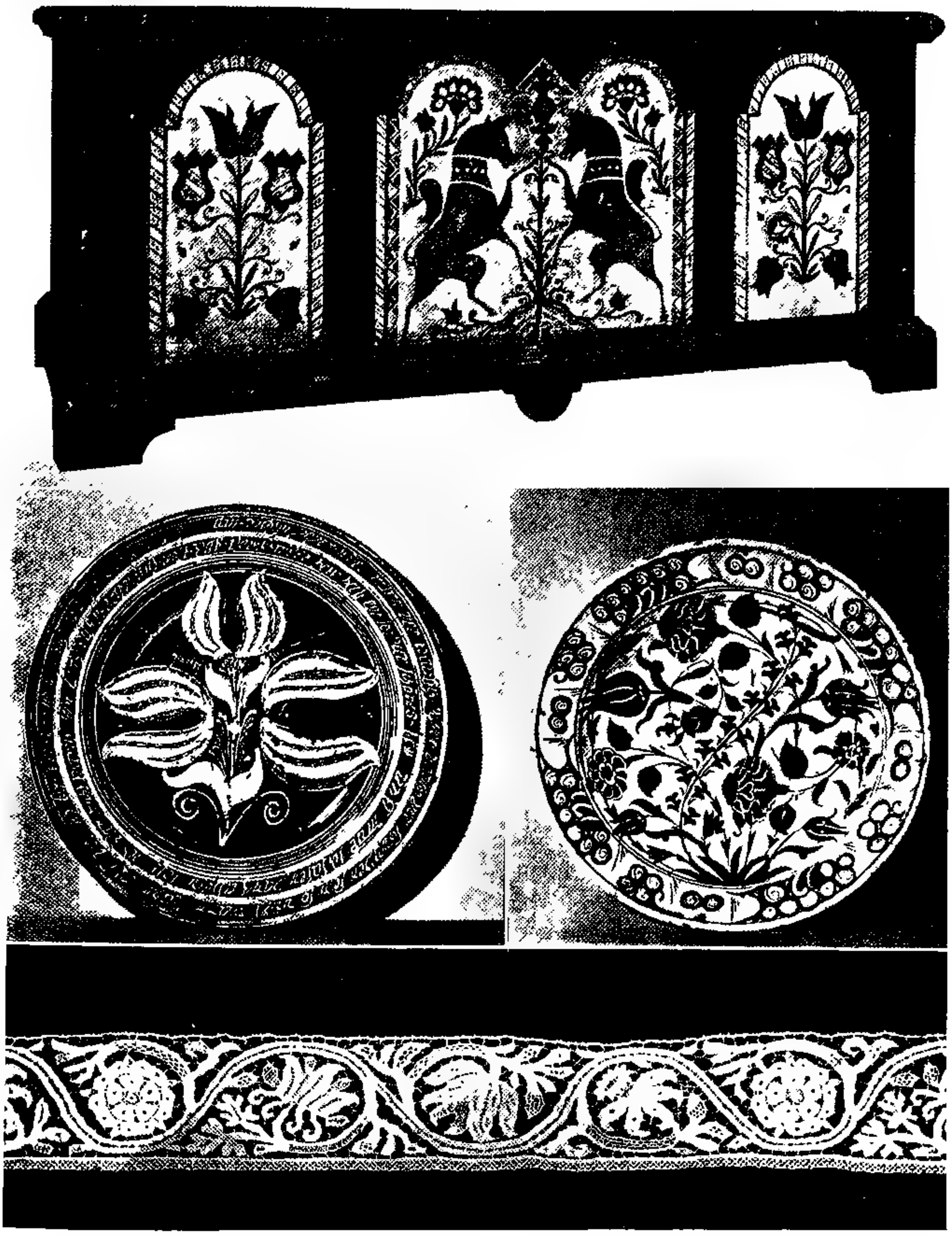
TULIPS IN FURNITURE, POTTERY, AND LACE

(*For description, see the opposite page.*)

The Pennsylvania German pine chest of the 18th century, shown at the top, was illustrated in Wallace Nutting's "Furniture Treasury," Vol. I. The pottery plate at the left with slip decoration, also of Pennsylvania German workmanship, is dated 1769. Photographs of both are by courtesy of the Philadelphia Museum of Art. From the Metropolitan Museum of Art in New York comes the illustration of the glazed plate featuring the tulip, dating from the 17th century Turkey. The lace border in linen needlepoint, made in Spain in the 17th century, and designated as "punto in aria" in design, is from the collection of laces at the Cooper Union Museum for the Arts of Decoration in New York.



TULIPS IN FURNITURE, POTTERY, AND LACE

REPRODUCTION OF A SILK DAMASK
OF THE ITALIAN RENAISSANCE

In this textile, which is used in the Apollo Room in the Raleigh Tavern, Colonial Williamsburg, Virginia, the tulip is combined with turtle-doves and a crown in a symmetrical pattern. The original was of Italian design in the late 16th century. The modern textile was woven by Scalamandré.

of plant life being imported from the American colonies. During the 17th century, they, like the Germans, used the tulip as decoration on their slip-ware pottery. When, at the end of the same century, William and Mary came over from Holland to occupy the English throne, they brought Dutch artisans with them and throughout their reign we find the tulip extensively used in the beautiful marquetry work of their walnut furniture.

Court styles during this period also gave the hand-made lace industry an impetus which lasted from the time of William and Mary until the end of the next century, when machine-made laces began to take precedence. In the famous laces made at Honiton in Devonshire, the tulip motif often was seen.

The tulip made its debut in Italy during the early Renaissance, when it presumably entered by way of Venice, which was the gateway to the East. Through her seaport flowed all the treasures of the Orient, including those of Persia and Turkey. The tulip became one of these treasures, and we find its likeness in a highly stylized but recognizable floral motif in the Italian Renaissance textiles. It was usually portrayed in floral bouquets and often placed in classic urns. The Italians also had a unique fashion of having small tulip blossoms, among others, sprouting from the tops of pomegranates and artichokes in their designs. This was especially prominent in the Florentine ferronnerie velvets.

Among the elaborate Italian Renaissance laces we find the "punto in aria" which featured the tulip. This early type of needlepoint lace was first mentioned in 1530 before the advent of the tulip in Italy. Consequently it was not until a later date that the flower was adopted as a lace motif.

In the newly awakened appreciation of the arts during the Renaissance, there was a revival of interest in botany, as seen in the diversified variety of floral forms used in the designs of not only textiles but paintings, laces, and ceramics as well. Pattern engravers began to record them on their engraved plates, and among the flowers, of course, we find the tulip.

The Renaissance tulip was a bright red flower with broad pointed petals, whereas the flowers of Persia were either fringed or had petals terminating in long points. The Turks preferred red and yellow blossoms and the narrow pointed ones were their choice. The European's taste was for the rounded form of petal and their popular earlier specimens were white with distinctly marked colored stripes.

New varieties of the tulip have been developed and become the fashion, succeeding, temporarily at least, the older forms and colorings. But even today the flower remains materially the same as when it was first seen by westerners in Turkey and Persia in the 16th century. Whichever has been the favorite tulip in a country's gardens, from the time of its introduction, has generally been the type depicted in its works of art.

Breeding Chestnuts For Timber

By Arthur Harmount Graves
Connecticut Agricultural Experiment Station

I find that almost anyone of the older generation, when told that we are breeding the chestnut tree, recalls in his mind's eye happy hunting grounds — picnic parties in bright blue October weather, with the tangy smell of fallen leaves, poking the leaves aside and finding the shining brown nuts, or shaking the trees and hearing the nuts come pattering down. It was fun!

But when I tell these same people that the main object of our breeding work is to develop a tree of timber type to replace the mighty forest trees killed by the blight many years ago, their eyes take on that faraway look which makes me realize that this matter is somehow outside of their ken.

Why is this? I think it is true that we all loved those outdoor excursions and prized the gathering of the nuts, which were not only good to look at but also sweet and toothsome. But only a comparatively small cross section of our people are interested in wood and timber for its own sake, however important it may be to our national well-being. For it is a fact that of all the substances manufactured by plants, exclusive of foods, wood is the most important, and is absolutely essential to our progress as a nation. One has only to look about him to convince himself of the truth of this — houses, books, paper, furniture, tools etc.; and with the introduction of the modern plastics and plywood the importance of wood has been vastly increased.

And breeding a tree to get a new and better tree—is it possible? Why not? A tree is only a large plant, a woody plant, with flowers and reproductive organs like any other higher plant; and plant breeders everywhere are developing new flowers and new fruits with an accelerating tempo that is amazing. You who pore over seed catalogs must know this!

When that miserable little parasite, *Endothia parasitica* by name, alias the Chestnut Blight Fungus, attacked and ruined our vast chestnut forests it deprived the American people of a most valuable asset; which, in dollars, amounts to a loss of many millions, perhaps billions, if we estimate the standing timber that was destroyed. But if we could reckon up the loss of the chestnut through future ages, which in strict accountability is our real loss, the figures would become astronomical.

The American chestnut was of especial value as a timber tree because of its tallness and straightness, its ease of coppicing, (by which we mean the rapid way that new trees develop by sprouting from cut stumps), and

because of the capacity of the wood to resist decay. It is stated by officials of the Southern New England Telephone Company that even today some chestnut telephone poles which were "placed 62 years ago are still in use."* Telephone, telegraph and electrical companies require a pole that does not

CHESTNUTS IN THE DAYS BEFORE THE BLIGHT

Left, a forest grown American chestnut at Scotland, Conn., photographed by Walter Filley in 1905. The diameter of the trunk was 27 inches, the height of the tree 83 feet. Its crown covered 900 square feet and when it was sawed it made 662 board feet of lumber. *Right,* the growth of sprouts from the stump of a native chestnut in the days when large trees still could be found. These sprouts (which are the large trunks shown in the picture) eventually produced good crops of nuts. This photograph was made in Catlin's Woods, Litchfield, Conn., in January 1907 by Austin F. Hawes, then State Forester of Connecticut. Both pictures by courtesy of the Connecticut Agricultural Experiment Station.

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* See *Telephone Bulletin*. Sept. 1948. p. 12. Published by The Southern New England Telephone Company, New Haven, Conn.

easily rot at its base, where it is in contact with the soil. For the time is sure to come when these poles are subjected to a severe test, as when wind and ice storms rage, or, worst of all, hurricanes sweep through the land. Also, because of this quality of resistance to decay when in contact with the soil, the chestnut was valuable for railroad ties. Many an old New England house and barn dating far back into the last century, boast of their sturdy chestnut construction timbers, which still retain their pristine soundness and strength. Mine props, much in use in Pennsylvania, formerly a great chestnut-growing state, also demand a strong, decay-resisting wood, supplied in years past by the chestnut. The bark, and even the wood, contained a goodly proportion of tannic acid which was used by tanneries for tanning skins and hides. And as an ornamental tree, the chestnut, with far flung limbs when grown in the open, was a glorious sight, the pride of many a fine old estate.

We began breeding the chestnut in 1930. I had been interested in this tree, or more especially in its troubles, since 1910, when, as a young instructor, I was conducting a course in "Diseases of Forest Trees" at the Yale School of Forestry. Becoming a collaborator in the Division of Forest Pathology, U. S. Department of Agriculture, a post I have held ever since to my great advantage, I worked on the chestnut problem during the long summer college vacations. Soon after 1910 it became known that the Japanese chestnut, a comparatively low-growing tree, resisted attacks of the blight fungus. The resistance was not complete, that is, the fungus grew for a time in the bark, but ultimately, in many instances the tree formed a callus around the diseased spot and the tree was not girdled, as the American chestnut usually was.

Having tried for many years and by many methods to restore the chestnut tree, I decided to try breeding it with the resistant Japanese species. If we could combine the blight resistance of the Japanese with the tall erect growth of the American we would have the ideal chestnut. I was then a curator at the Brooklyn Botanic Garden and my assistants, Miss Hester M. Rusk and Miss Hilda Vilkomerson, the latter now of Brown University, received the project with enthusiasm. Miss Rusk, indeed, was well versed in the methods of plant breeding, having been formerly an assistant of Dr. A. B. Stout of this Garden, long known as a breeder of daylilies, poplars, and other plants. For the Japanese parents we used some fine specimens on Long Island estates which I had come to

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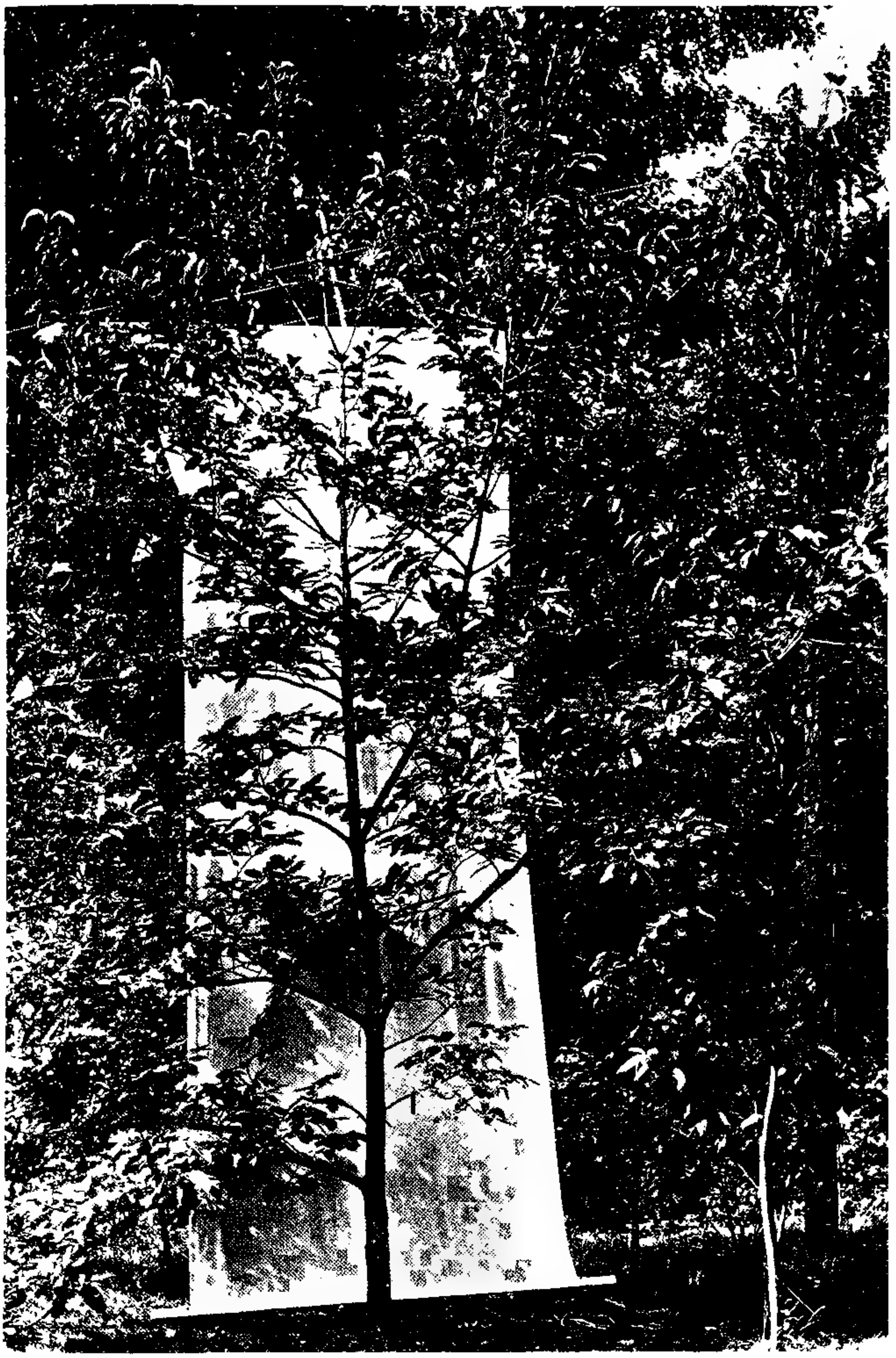
A HYBRID CHESTNUT OF TODAY

(On the opposite page)

Photographed by Louis Buhle in September 1948 at the Sleeping Giant Plantation this hybrid of a Chinese chestnut bred with a Japanese-American cross was 21 fee high at 11 years of age. It is blight-resistant to a high degree. The single erect trunk makes it a good timber type tree and its wide branching adapts it to natural pruning in close stands. Courtesy of Brooklyn Botanic Garden.



know well from my work with the Division of Forest Pathology. For the American parent we received pollen at first from a fine old American tree then still living near Washington, D. C. and sent through the mail by the U. S. Department of Agriculture. The results of the work during these early years are all published in detail in the Annual Reports of the Brooklyn Botanic Garden. The most important facts which emerge are:

1. We made many good crosses of Japanese and American chestnut.
2. In most of these hybrids growth was remarkably rapid—often 4 feet per year—an evidence of the phenomenon of "hybrid vigor."
3. In all of these, the American parent was dominant, that is, the trunk was erect and, unfortunately, the individuals were susceptible to the blight.
4. The susceptibility to the blight was not, however, as pronounced as in the American parent. In other words, the dominance of the American was *incomplete.*

It was evident that the Japanese character of resistance was present in the hybrids but, as the geneticists say, it was more or less *recessive.* Only by further breeding of these hybrids could we hope to develop our blight-resistant timber chestnut. It was therefore absolutely necessary to keep these hybrids alive and vigorous in order to continue our breeding. Fortunately nature stepped in here and showed the way. From blighted trees shoots or suckers arise, sometimes below the canker and sometimes at the base of the tree. It was a simple matter to graft the tips of these shoots onto the trunk *above* the diseased area, having first cut out all diseased tissue to prevent the spread of the fungus. This method of "inarching" has proved eminently successful, so that Japanese-American hybrids which were attacked by the blight fungus more than 10 years ago (1937) are still alive and vigorous.

We soon learned that the Chinese chestnut, although in general a comparatively low-growing tree like the Japanese, is superior to the Japanese in its greater blight resistance. In the beginning this species was not available to us. Therefore we now crossed our Japanese-Americans with the Chinese, beginning in 1935, and this has been part of our program ever since, until in 1948 we had nearly one hundred individuals of the pedigree Chinese x Japanese-American. The one shown herewith had just finished its 11th year from seed and was 21 feet tall with a stout, erect trunk and branches at a fairly wide angle. This last is a good feature for a timber tree, since in close stands it is favorable to easy self-pruning. So far this tree has been blight free, as have the great majority of its consanguineous relatives or "sibs." I believe that we have in this stock the forerunner of a new chestnut timber tree which will replace the old American chestnut. Already we have furnished seedlings of this and other pedigrees for six test plots in the forests of the eastern states. These plots have been established under the supervision of Dr. J. D. Diller of the Division of Forest Pathology of the U.S.D.A., by a special method which he originated.

How You Can Help

You can help the various co-operating agencies in their effort to bring good chestnut trees for lumbering, ornament, and nuts back into the American scene by giving us information of the location of living chestnut trees that are 5 inches or more in diameter at the ground, and by sending us nuts of native chestnuts; but the nuts should not be allowed to become dry, as drying kills the embryo. They should be packed in peat moss, moist cotton or something similar and mailed to me in care of the Connecticut Agricultural Experiment Station, 123 Huntington Street, New Haven, Conn. — A. H. Graves.

One more word as to our latest development in breeding. Up to 1947, while I was a curator at the Brooklyn Botanic Garden, the work was sponsored primarily by the Garden, but having now retired from curatorial duties I am continuing the chestnut breeding work under the aegis of the Connecticut Agricultural Experiment Station, which has been interested in the chestnut problem since the discovery of the blight, in 1904. Here, I have had the advantage of consultation with the Station's geneticist, Dr. D. F. Jones of hybrid corn fame. Last year (1948) Dr. Jones suggested that a further crossing of the Chinese x Japanese-American ("C.J.A.'s" we call them for short) with pure American stock might give valuable results. Fortunately, at that time, through the interest of Mr. George A. Holmes of Southbury, Conn., we had been put on the track of some fine resistant American chestnuts still living and thriving, although badly cankered with the blight, in the town of Roxbury, Conn. And so last summer we crossed these natives with C.J.A. pollen brought from our plantation at Hamden and as a result harvested 95 nuts of the pedigree A. x (C.J.A.). Mr. Allen S. Hurlburt, Selectman of Roxbury, and his brother, Mr. Everett B. Hurlburt, are keenly interested in the work and are keeping a watchful eye on the trees, which are wayside specimens, and therefore strictly the property of the town of Roxbury.

Just what result this new breeding will bring no one can tell. We are hoping, however, that it will mean growth to a greater height. If the new hybrids prove blight susceptible, that can be taken care of by the inarching method, and then they can be bred again to the resistant Chinese or with each other.

It must not be gathered from the above that our work has produced only the hybrids mentioned: we have tried many combinations and have now more than 50 new to science. Nor have we neglected the nut phase of the problem. There are several hybrids with good edible nuts which, after we have tested them more thoroughly, will be put on the market.

In all there are now more than 3,000 trees on our plantations, the prin-

cipal ones being on the southern slope of the Sleeping Giant Mountain, Hamden, Conn., and at the Connecticut Agricultural Experiment Station Farm at Mt. Carmel, Conn. There are also co-operative plantings at the White Memorial Foundation at Litchfield, Conn., and on land of Mr. Archer M. Huntington at Redding Ridge, Conn. We are planting all American nuts sent to us on the chance that they may contain a blight-resistant quality. The resulting American seedlings are being set out on the Yale Forest, Union, Conn., and are in charge of Mr. Basil Plusnin, Forester.

Through a co-operative arrangement between the Connecticut Agricultural Experiment Station and the Yale School of Forestry, a scholarship has been established, the recipient of which will devote his time to studies related to chestnut breeding and research on the chestnut blight.*

In addition to the co-operation of the Division of Forest Pathology, U.S.D.A., the Connecticut State Geological and Natural History Survey has of late years given us substantial assistance.

Even with continued help, in all probability a long period of years must elapse before chestnut trees can again be cut for lumber, but today there is promise that the valued qualities of the American chestnut of the past can be incorporated in newly developed trees for future generations to inherit and to use. And, in the meantime, the Chinese chestnut can furnish the nut enthusiasts a very acceptable substitute for the sweet American nuts.

Early History of Cinchona

By F. R. Fosberg

FEW single plants have been the basis of such an enormous amount of writing as *Cinchona*. Bergen, in 1826, listed over a thousand titles, and there were complaints that he had ignored many that were published in Spanish. That was only the beginning. The real flowering of this literature was in the nineteenth century. In the twentieth century articles and books have continued to appear, especially around the time of various tercentenary celebrations of the discovery of the drug, in 1930, and since the attention of the world was focused on it during the second world war.

Much of this literature consists of minor or casual articles, rewriting of earlier works, compilation, and popular accounts based on little or no

* The present incumbent, chosen in September 1947, is Mr. Hans Nienstaedt, a graduate of the Royal Veterinary and Agricultural College at Copenhagen, Denmark. Mr. Nienstaedt received the degree of Master of Forestry from the Yale School of Forestry in June, 1948, and is now a candidate for the degree of Ph.D., his major thesis being concerned with the chestnut breeding work.

research. But among this plethora occasionally there is produced an item of outstanding merit. Such, in recent years, have been A. W. Haggis' "Fundamental Errors in the Early History of Cinchona" (1941) and W. H. Camp's "Cinchona at High Altitudes in Ecuador" (1949). The latest to appear is "A Critical Review of the Basic Facts in the History of Cinchona" by Dr. Jaime Jaramillo-Arango.[1] It is probably not extravagant to say that this is as nearly a definitive treatment of the early history of *Cinchona* as will ever be written. So thorough has been the investigation by this distinguished Colombian scholar that, though some points are left unsettled, the chance of finding any fresh evidence of importance is so remote that only an extreme optimist would undertake any further detailed investigation.

This carefully documented report is the result of some years of intensive study and utilization of the incomparable research library facilities of London, with use by correspondence and photocopy of unique documents in Spanish archives, those of the Vatican, and other important depositories.

The author accepts the probability that the American aborigines knew and used cinchona bark. This has always seemed quite logical, whether or not one believes that malaria was present in the New World prior to the arrival of the Spaniards. So many plants are believed to have medicinal virtues by the Andean Indians that it is unlikely that cinchona would have been missed by all tribes.

That malaria was present, as believed by the author, is scarcely established by the fact that epidemics occurred among Spanish armies. Since anopheline mosquitoes were certainly present, one Spanish soldier, infected before leaving Europe, could have supplied the parasites for an epidemic. Even less convincing is the idea that malaria came with the original settlers from Asia. These migrations might have taken many generations and were largely through anopheles-free regions. Surely the disease would scarcely have persisted under such conditions.

These are examples of the basic uncertainties inherent in the history of cinchona. They are not likely to be solved in the future and one man's opinion is about as convincing as another.

Most of the other basic uncertainties are recognized as such by Dr. Jaramillo. It is obvious that one can never be sure of the actual earliest use of cinchona bark by Europeans, or of the authenticity of the various accounts. Much less is it probable that the details of the aboriginal discovery of virtues of this bark will ever be unraveled.

The usual legendary accounts are mentioned and some pages are devoted to the legend of the Countess of Chinchon, with the admission

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[1] "A Critical Review of the Basic Facts in the History of Cinchona" by Dr. Jaime Jaramillo-Arango, former Rector of the National Faculty of Medicine of Bogotá and former Colombian Ambassador in London, in the Journal of the Linnean Society of London, 10 March, 1949, pages 272-309.

DR. FOSBERG, who is now engaged on a study of the Pacific Islands vegetation for the Catholic University of America, spent the war years hunting for and studying *Cinchona* in South American forests. His work on quinine was continued during 1947 on a John Simon Guggenheim Memorial Fellowship, in combination with a grant from the New York Botanical Garden.

that it has, by Haggis[2], been "almost proved to be a fiction." The account of this legend is justified by the fact that the author has settled satisfactorily the question of whether or not the spelling *Cinchona* of Linnaeus was an unintentional orthographic error. Much of Linnaeus' information, he points out, came from sources (Geoffroy and Bado) where the name of the Countess was spelled "Cinchon." Thus the orthography on Linnaeus' part was deliberate, and was not altered in any of his subsequent works. Further, it is obvious from such remarks as "a tale of great romantic character" and "just because they are so fanciful such colorful legends deserve to survive," that the author's truly artistic soul is delighted by these legends, which is as it should be. History is much more interesting so adorned as long as it is made clear that the adornments are legends. Meanwhile, he, more thoroughly than anyone before, demonstrates the Chinchon story to be fictional.

Who first introduced cinchona bark into Europe is another matter the uncertainty of which is more amply demonstrated in this work. He regards it as the most plausible theory that the Jesuits at least introduced it first to Rome and brought about its widespread use, even though others may have brought it previously to Spain.

The section on the early confusion of the barks of the Peru balsam tree (*Myroxylon*) and of *Cinchona,* explaining the probable transfer of the widespread vernacular name QUINA-QUINA or QUINA from the former to the latter, is excellent. Here also the other vernacular name CASCARILLA is accounted for as a comparative implying a difference between *Cinchona* and another or thicker bark, that is, of *Myroxylon.*

In the section on the etymological origin of the word QUINA he disposes of some of the ideas of older writers and suggests what is plausible enough, that the Quichua speaking Indians might very well have given the name QUINA-QUINA as an original name to the leguminous tree yielding Peru balsam. The speculations of numerous authors on possible connection with QUINUA, QUINUAQUINUA, etc., seem to little point. And, at least in modern Spanish, the word "legumbre" could as well mean vegetable as "leguminous plant." In light of the present-day Quichua

[2] See Svenson, Henry K., "South America's Contribution in Medicinal Herbs," pages 177-178, in this Journal for July 1942.

usage of QUINUA equally for the rosaceous tree *Polylepis* and the vegetable *Chenopodium quinoa,* this would render Haggis' derivation of QUINA from this word on the basis of the leguminous fruits of the balsam tree even more improbable.

A detailed and extensively documented section shows that most of the references claimed by earlier writers to be the first works on *Cinchona* written in Europe do not refer to it at all, and that probably the earliest actual reference is the *Schedula Romana,* ascribed to Puccerini, in 1649. The number of erroneous and misleading published statements revealed here on this and various other points makes one skeptical of almost anything written on this subject. The section on the early controversy regarding the medicinal value of the bark is careful and adequate, though not as dramatic as that in "The Fever Bark Tree" by Mrs. M. L. Duran-Reynals[3] (1946).

Of great botanical interest is the discussion of the classification of *Cinchona* by Linnaeus, his correspondence with Mutis, and the change in the basis for the genus *Cinchona* from the original *C. officinalis* to *C. cordifolia* (*C. pubescens*) in the twelfth edition of Systema Naturae, 1767. This is supported by reproduction of the earlier illustrations of *Cinchona,* including that of La Condamine and a previously unpublished one by Santisteban which formed a part of the information available to Linnaeus. The La Condamine illustration is clearly the Loxa (now spelled *Loja*) plant always considered the typical *C. officinalis* L. The other, though equated by Jaramillo with the *C. cordifolia* of Mutis, seems clearly enough to be some member of the complex to which the names *C. macrocalyx, C. pitayensis,* etc., have commonly been applied. The arrangement of the flowers in the cluster, the large calyx, the narrow corolla lobes, and the cylindric fruits, as well as to some extent the leaf shape support this disposition.

The above discussion, commenting only on a few critical points, gives no real idea of the wealth of information contained in this paper. It will be the reference for all future discussions of the matter.

It is a real pity that the editing and proof-reading could not have been on a plane equal with the writing of the paper. The author was kind enough to send me a corrected copy,[4] with an apology for the 25 errors indicated, a good part of which are clearly the result of editorial meddling. In a work of this sort it is even more than usually important that the author's intent not be changed, as Dr. Jaramillo's paper will doubtless be taken not only as a basis for all future historical works on this subject, but probably for studies of other aspects of the cinchona story.

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[3] Reviewed in this Journal in September 1946.

[4] The corrections marked in this have been transferred to the copy in the New York Botanical Garden's library.

NOTICES AND REVIEWS OF RECENT BOOKS

Standard Reference Work Revised

MANUAL OF CULTIVATED PLANTS. L. H. Bailey. 1,116 pages, illustrated, indexed. Macmillan, New York. Revised edition 1949. $17.50.

This is an important book of which much will be expected, and serious gardeners and plantsmen of varied interests will scan it with critical eye.

Plant families are listed genealogically in their classified botanical divisions. Illustrations of the reproductive organs and growth habits of the plants are arranged in front of each family. The latter is an innovation which will help the student in identification work.

It is a book of immense value to the student of plants and must be considered as directed to him rather than to the experienced horticulturist, who would not attempt to cultivate some of the species included, but who will deplore the omission of many. For instance, when we turn to *Hedera Helix,* we find that no mention is made of the variety *baltica,* which is considered hardier than the type and which is propagated commercially in quantity; nor is *Gaultheria Shallon* listed, although it is used in quantity by florists. Turning to *Begonia,* it is disappointing to find that *B. cheimantha,* one of the groups grown in greatest quantity, is not mentioned under that name, but included in the hybrids "Gloire de Lorraine" and "Gloire de Sceaux," which probably do not exist today. The name *cheimantha* is used in Hortus II.

Such comments are not meant as destructive criticism. No compilation of this description—and there is no other—could completely please a population of diversified interests. So many hybrids are found among cultivated plants that it would be impossible to satisfy the daffodil, tulip, iris, peony, rose, gladiolus, dahlia, chrysanthemum and orchid enthusiasts, not to speak of other specialists. In passing it is interesting to note that the erstwhile *Paeonia albiflora* is now *P. lactiflora.* The peony species *lutea* and *Delavayi,* parents of a fine group of hybrid shrub peonies, are not listed.

However this is a worth-while revision of a reference book which for the past generation has been a standby for botanists and serious gardeners. A new edition of the long used and long out-of-print manual of 1924 had become essential for plant students. While the price of the present volume makes it something one can scarcely afford to acquire, still more is the book a reference work one can not afford *not* to own.

JAMES G. ESSON,
Editor, *The Gardeners' Chronicle.*

Epitome of Regional Floras In Popularized Style

AMERICAN WILD FLOWERS. Harold N. Moldenke. 453 pages, illustrated, indexed. Van Nostrand, New York. 1949. $6.95.

The botanical side of the natural histories of the nineteenth century for the most part described the strange and spectacular plants seen by travelers in faraway corners of the world. They were illustrated usually by black-and-white reproductions of engravings and poor photographs, and had as their object something more akin to certain of the comic strips than to educational publications. The reader was supposed to marvel as he sat at home.

This book, their latest successor, and the first in a projected series called "The New Illustrated Naturalist," is stated to deal with the showiest and most interesting plants of the United States and Canada, and to be popularly written, copiously illustrated, and usable, in place of regional botanies, by travelers, both amateur and scientific, as they journey through the country. Dr. Moldenke hopes to instill in readers a desire to become intimate with the plants of the continent, and not merely to learn their names.

The first choice of material was through a questionnaire sent to 1,100 naturalists and botanists. Each was asked to list the twelve showiest and most interesting herbaceous plants of his area, native or

escaped. More than one thousand of these formed the first selection. They were supplemented to bring the total of described forms to 2,050 out of a possible 32,000.

The text is illustrated by color photographs showing 88 species or sub-species, mostly from different genera, and by black-and-white photographs of 69 other forms. The system of numbering the 64 plates, Arabic for the colored ones, Roman for the others, is a little confusing, as is evidenced by the illustration of fire-pink, which is pictured on plate 7, although the text lists it on plate VII. Since these pictures cover the whole North American continent the number relating to at least some areas is not large.

The families of plants are grouped into 50 chapters arranged according to a "modern"—and, to most of us, an unfamiliar and rather puzzling—system: buttercups to composites to mints, then monocotyledons. Each chapter is prefaced by world statistics of the number and distribution of the members of the family or families contained in it, and by a summary of its distinguishing characters. The chosen species of a genus are generally described, though very briefly, usually beginning with the eastern states and working westward. It is necessary, therefore, to know the family to which a plant belongs, or else to read through the summaries of characters. These, it seems to me, might better have been collected in another place, for comparison.

Both scientific and common names are given. An interesting part of the introduction deals with some reasons for the changes in scientific names: an explanation valuable here because of the very modern nomenclature. Many of the common names are written as compound or hyphenated, such as "long-bracted tick-seedsunflower" and "Douglasfir." These —whether we like them or not—follow a recommendation of the American Joint Committee on Horticultural Nomenclature.

The descriptive terms used are elucidated in a glossary, which consists of illustrations borrowed from Dr. H. A. Gleason's "Plants of the Vicinity of New York", and of definitions, including some perhaps unnecessary terms describing surfaces.

There is an annotated bibliography of 66 titles, about two-thirds of which are texts on regional botany.

Appropriate quotations preface and follow each chapter and frequently appear in the text.

Dr. Moldenke has been able to subordinate the technicalities of a taxonomic botanist to the readable style of his popular lectures. The volume is full of information obtained from his wide reading and his own observations: the origin and meaning of names, adaptations which aid in pollination, explanations of plant processes, and ecological and economic notes.

This is not, however, a book for the amateur who, starting from scratch or near it, wants to identify a specimen by matching it with a large colored picture or by searching in a text where flowers are grouped according to some simple system, such as color. It is a volume in which a person with a slight knowledge of plant families may increase his information as to those flowers which he already knows, with these as a starting point may identify new specimens at home or in distant places, and may learn about others which he himself may never collect. Thus it is an epitome of many regional floras; and it also gives a good background for the popular side of botany.

MARY F. BARRETT,
Montclair, N. J.

Rural Living in an Earlier Day

THE LAND OF THE CROOKED TREE. U. P. Hedrick. 350 pages. Oxford University Press, New York. 1948. $4.

In this carefully detailed account of the life of a pioneering family in the wilds of Michigan, Dr. Hedrick has given his readers a tale to ponder over. The book is crowded with entertaining bits of living between the years of 1874 and 1890; things we have either never known or have forgotten.

We are grateful to this writer—better known for his encyclopedic works on fruits and vegetables and on other economic plants, as well as for numerous more popular books on fruits, grapes, wine, and for his "History of Agriculture in the State of New York," all written during his long years (ten as Director) with the New York State Agricultural Experiment Station at Geneva—for bringing the rural life of an earlier day back to us in this delightful fashion.

HELEN M. WOODWARD.

Poetic Perfection In Oriental Horticulture

GARDENS OF CHINA. Osvald Sirén. Translated by Donald Burton. 141 quarto pages, bibliography, index, 208 plates, boxed. Ronald Press, New York. 1949. $30.

The author of this beautiful book was formerly at both the University and the National Museum in Stockholm. The book is particularly welcome for there is very little literature available on the design of Chinese gardens. Sir William Chambers in the eighteenth century wrote a fascinating book, "A Dissertation on Oriental Gardening," which provided the inspiration for the Chinese pavilion at Kew; some interesting work has come out of Yale, and there have been the plates of Chinese gardens published by Le Rouge, a scarce, rare set of three volumes available only to researchers who go to museums and libraries. Otherwise, there is little that is comprehensive in the study of Chinese gardens.

Throughout Sirén's book the close relation of the design of Chinese gardens to landscape painting is stressed, and illustrations are given, some of them in delicate colors, to prove the points made. Professor Sirén, who says there were more gardens in Chinese towns than in the country, tells how the art of garden design expressed the philosophy of the artists, and how garden and house were closely related. The Chinese have always been poetic about nature and also about their gardens. They have used strangely shaped rocks, and created miniature hills, ponds and brooks. Their year begins with the blossoming plum tree, grown with pine and bamboo, the so-called three friends of the cold season. The trees have been trained to become gnarled in order to harmonize with the rocks. Orchids, grown for their fragrance, early became the symbol of feminine charm. Chrysanthemums are the flowers of autumn, while peonies which dominate the summer season have been called the "King of Flowers." There are always many pot plants; oddly enough, even lotus has been grown in pots.

A valuable list is given of trees, shrubs and perennials grown in the gardens and there are chapters each on architecture, pavilions, bridges and galleries. These are illustrated with black and white drawings clearly rendered. There are also designs of balustrades, in most unusual and attractive patterns, and others of utterly charming window lattices and various types and shapes of ornamental windows. Then there are drawings of patterns for brick walls, shapes of vases, water courses, doorways, and for laying out paved walks, either with brick or with river pebbles.

There are also descriptions of famous gardens of the past. Besides illustrations throughout the text there are 208 illustrations from photographs and old prints in the second half of the volume.

Altogether this is a most informative and stimulating book—one that will undoubtedly have an influence on the making of future American gardens. It is hoped that the spirit which animated the creation of these beautiful oriental forms will be used as an inspiration and that they will not be merely copied or placed in inappropriate situations.

HELEN M. FOX.
Mt. Kisco, N. Y.

Genes on the Loose

INTROGRESSIVE HYBRIDIZATION. Edgar Anderson. 109 pages, illustrations, bibliography, index. John Wiley New York, 1949. $3.

A certain eminent plant taxonomist recently remarked in the presence of this reviewer that, in his long experience in the field, he had seen only three cases of natural hybridization — and that he was not certain of two of them. Even a casual perusal of Dr. Anderson's small volume would dispel the misconceptions of those who hold that hybrids are not common in nature, or who doubt that introgressive hybridization has been a potent factor in bringing about the variability which one can see within so many species.

Actual examples of natural hybridization are analyzed and interesting theoretical considerations are treated in a lucid and original manner in this book. Special techniques for the study of introgression also are presented. It is a book which should be in the hands of every taxonomist; and the enthusiastic and enquiring amateur student of local flora will find in it much to explain why so many specimens of certain species do not exactly fit the tidy descriptions in current manuals.

W. H. CAMP.

Wayside Gardens

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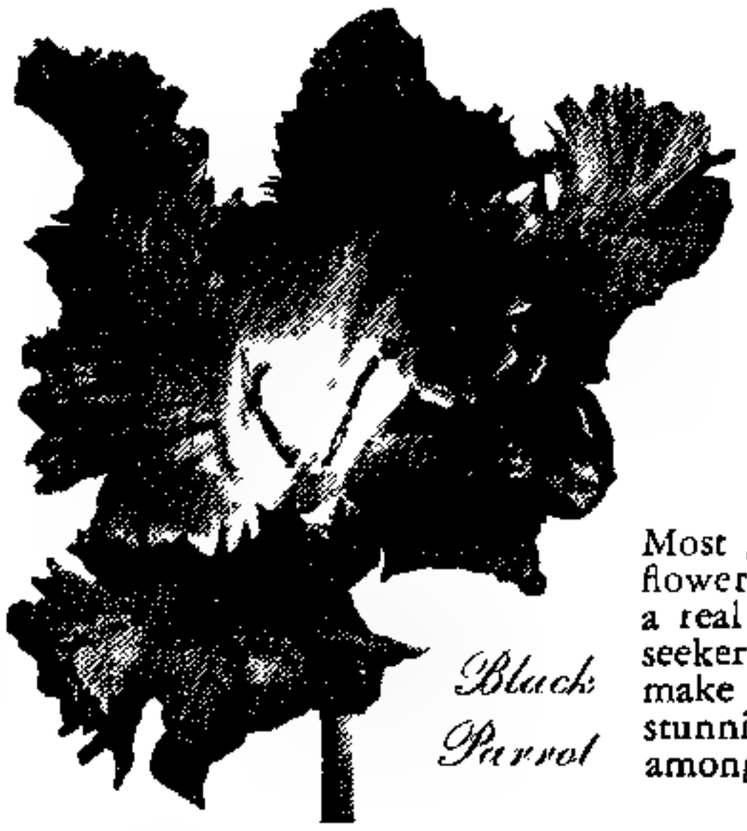

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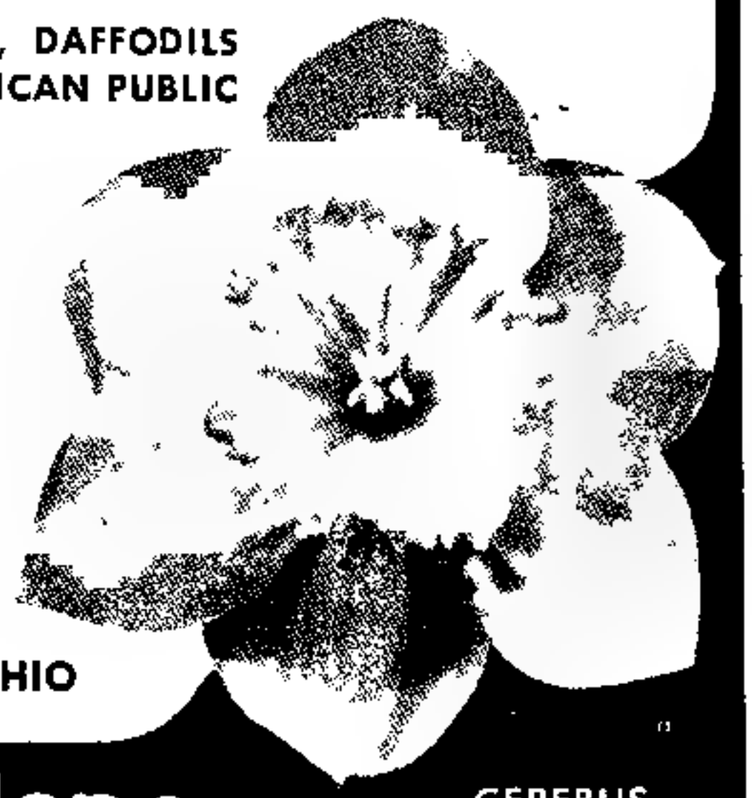

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Wayside Gardens

CEREBUS

Portrait of Fiji And of a Personality

NATURALIST'S SOUTH PACIFIC EXPEDITION: FIJI. Otto Degener. 303 pages, illustrations, maps, index. Published by the author, P.O. Box 187, Waialua, Oahu, T.H. 1949. $5.

Otto Degener has a niche in botanical history for giving his name to the Degeneriaceae, the genus *Degeneria,* and numerous little "degeneri's" as specific names. He now has another niche: as the author of this volume, which recounts his explorations while with the Anne Archbold expedition on the motorized junk *Cheng-Ho.** Here is a book to take its place beside the classics of the 19th century traveling naturalists, thoroughly modern, yet in an established style and tradition that has a parallel in such compositions as Prokofiev's "Classical Symphony."

The author has a rare trait of choosing his native friends with discernment, and of gaining their affection with their confidence—a task difficult in a land where the race problem is no better (or worse) than in our own lynch-conscious southern towns. As a result, this delightful account of his wanderings about the islands, filled with the human side of his experiences yet presented with the impartiality of a scientist (even to a minutely detailed description of yangona drinking, with clocked notations, some at one-half minute intervals during the ceremony), all give us an exciting picture of the islands of today.

The book is written with a complete lack of that "diplomacy" that often colors the words of professional lecturers and travelers and others seeking to climb success's ladder, and the narrative is backed by supporting chapters on the history of Fiji and its customs. When today has gone, the volume will serve the ethnologists of the future for its basic data of this age.

"Portrait of Otto Degener" might well be the subtitle of this unusual book, which is all the more pleasing since the picture appears unplanned and unconsciously drawn. A hundred little anecdotes, some uncomplimentary to himself, and the absence of such stories as many authors use to prime their pompousness, all have their cumulative effect. As one closes the book, one knows not only Fiji, but also Otto Degener the man—so sage and kindly that one wishes more of his kind would tread the earth.

FRANK E. EGLER,
Aton Forest, Norfolk, Conn.

*Parts of the book appeared originally in the Journal of the New York Botanical Garden for September and October 1943.

Authoritative Treatise on Corn

CORN AND CORN GROWING. Henry A. Wallace & Earl N. Bressman. 424 pages, illustrated, indexed. Fifth edition prepared by J. J. Newlin, Edgar Anderson & Earl N. Bressman. John Wiley & Sons, Inc., New York, 1949. $4.50.

This popular book on corn has been revised to include up-to-date developments in breeding, seed processing, planting, harvesting and marketing. A section on chemical weed control as related to the use of 2, 4-D has been included.

The story of corn from the various theories of its origin, types, modern hybrid corn production, and its extensive use for feed and food is described accurately and in a good readable fashion. The subject is treated in such a comprehensive manner that a complete picture of America's most important crop is secured.

While anyone basically interested in corn will find this a useful book as a source of information and as a reference, seedsmen, farmers, and students studying grain crops especially will find it valuable.

GILBERT H. AHLGREN,
Rutgers University.

Buy Christmas Seals

Help Stamp Out TB

Pamphlets and Such

OUR HERITAGE TO HOLD

Presented in a format and editorial style of unusual appeal, "Our Heritage to Hold" has been issued as an illustrated conservation guide by the Federated Garden Clubs of New York State, under the direction of Mrs. Mary M. Slifer of Rochester, conservation chairman of the seventh district. Two pages each are devoted to soil and water, wild flowers, birds, trees, and ferns, and additional pages to insects, snakes, and mushrooms, each subject with a list of recommended reading.

EARHART PLANT RESEARCH LABORATORY

As a prereprint from *Chronica Botanica,* Volume 12, a description of the Earhart Plant Research Laboratory at the California Institute of Technology by Dr. F. W. Went has been distributed. The elaborate setup of the new structure, which is being called a "phytotron," will make it possible to grow plants under practically every climatic condition in which plants grow in nature.

HERB CULTURE AND USES

Elizabeth C. Hall is the compiler of a reading list on "Herb Culture and Uses" issued by the New York unit of the Herb Society of America, of which she is an honorary member.

HERB GROWER'S HANDBOOK

The "Herb Grower's Handbook" published by The Fosters of Falls Village, Conn., at 25 cents a copy is a small, convenient guide for the planting and cultivating of 42 kinds of annual and perennial herbs.

WATER ECONOMY OF PLANTS

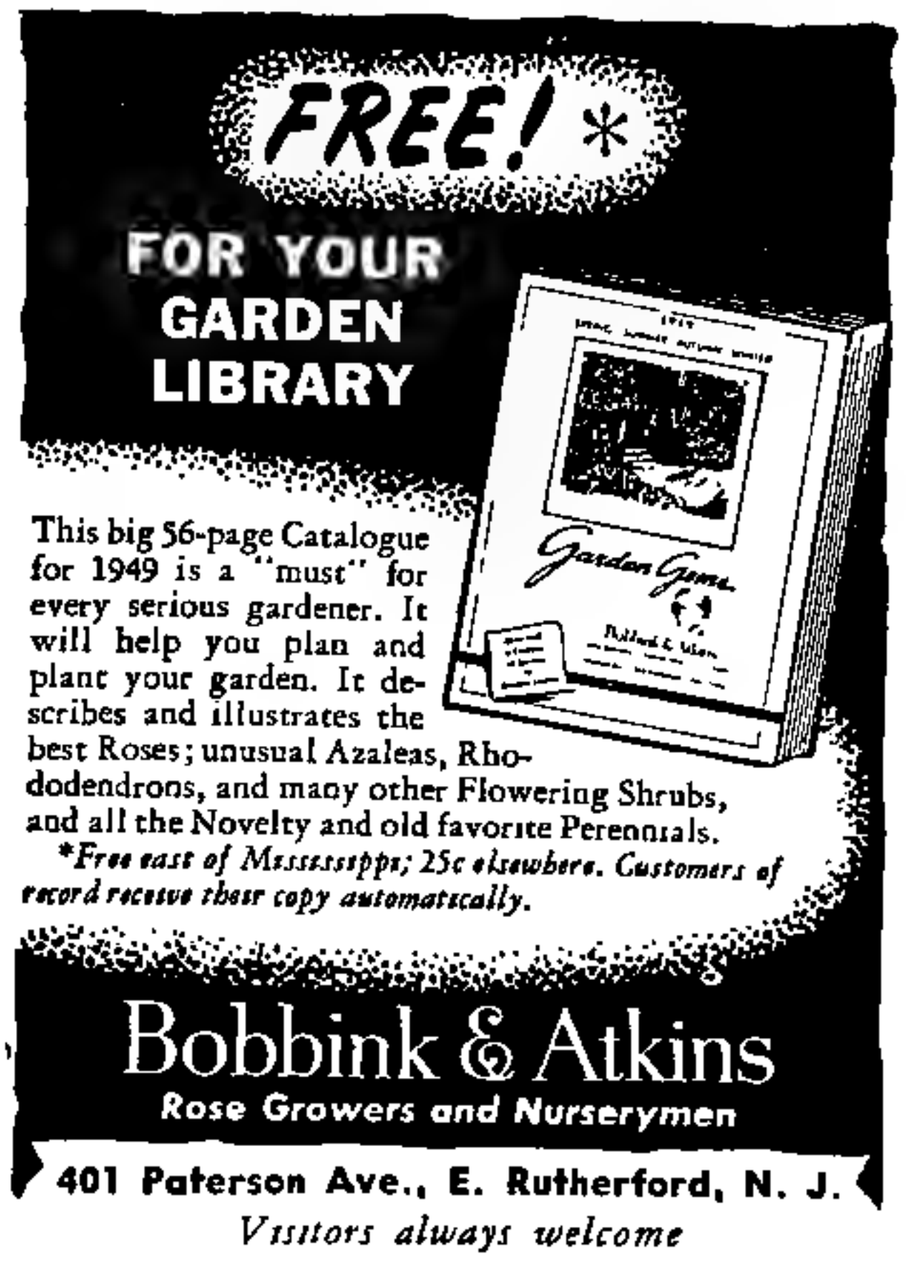
Questions of importance to gardeners who are concerned with the proper methods of watering—whether their plants are in pots, in a flowering border, or on an acre or more of open ground—are answered in "Water Economy of Plants" by H. L. Shantz, issued as No. 6, Vol. 1, of Leaflets of the Santa Barbara Botanic Garden. Eye-openers such as this remark are made: "At Bard (Calif.) during midday in summer a 10 acre field of alfalfa would pour into the air a ton of water every 10 seconds." And this: "It is safe to assume that growing plants in our gardens . . . will use from 200 to 600 pounds of water for every pound of dry matter produced."

Easily understood explanations are given of the water-holding capacity of different types of soil and of the use of water from the soil by plants of different types.

A baker's dozen of practical suggestions at the end provide good advice for the practical gardener, and for those who wish to read further in the subject there is a list of 25 references.

MEDICINAL HERBS IN CANINE AILMENTS

Herbs used by the North American Indians and by the gypsies of Europe form much of the basis of the book by Juliette de Bairacli-Levy on the use of medicinal herbs in the treatment of diseases of dogs. Such familiar plants as thyme, mint, rhubarb, garlic, horehound, lettuce, parsley, peppermint, and rosemary are among the herbs recommended for various cures. This first American edition (1948) represents the fourth revised edition of the book. It has been issued by Sirius House, Brooklyn, at $2.75.



Tracer Techniques

RADIOACTIVE INDICATORS. George Hevesy. 556 pages, illustrated, indexed. Segre Isotope Chart. Interscience Publishers, Inc. New York, 1948. $10.

The author of this book was the first to use radioactive indicators (in 1920). There is a brief account of the production and measurement of radioactive substances. In the last 420 pages are discussed the absorption, distribution and excretion of the elements as measured by various tracer techniques. Turnover studies are reported in detail for phosphate, nitrogen, iron, and other biologically essential elements. Most of the experiments were done on animals. The book is recommended to all who use tracer methods.

F. W. KAVANAGH.

Historic Textile

THE STORY OF SILK. William F. Leggett. 361 pages, glossary, bibliography. Lifetime Editions, New York. 1949. $5.

This book is an absorbing account of the cultivation of silk from 3,000 B.C. in China, to the present day. It contains fascinating historical data. It dwells at length on the importance of plant life to the proper growth of the silkworm. The glossary of silk names in general use with which it ends is unusual. All in all, the book is mighty good reading!

BERNICE S. BRONNER,
Secretary, American Association of Textile Technologists.

Notes, News, and Comment

John Horvath. The man who had charge of the spraying of plants at the Garden during the past four years died Oct. 8. He was John Horvath, a member of Mr. A. C. Pfander's staff, who had been assigned to the plant pathology department shortly after he began his employment at the Garden in July of 1945. His spraying job was initiated under Dr. B. O. Dodge, for whom he worked as outdoor assistant in the control of diseases and pests, and he continued to serve in this capacity when Dr. P. P. Pirone became plant pathologist two years later. He leaves his wife and a small daughter.

Visitors. Dr. Chester W. Emmons of the National Institute of Health at Bethesda, Maryland, visited the Garden while he was in New York during the week of Oct. 24 to give a talk on dermatology at a meeting at Columbia College of Physicians and Surgeons.

Dr. F. R. Fosberg of Washington, D. C., who opened the autumn programs of the Horticultural Society of New York with a lecture on plant exploration, spent some time at the Garden the preceding week.

Dr. & Mrs. T. H. Ho were Garden visitors Oct. 10. Dr. Ho was Professor of mycology and plant biology at Central University in China for 20 years and is now in this country.

Miss Harriette Britton, sister of the Garden's first director, was a visitor on October 10. On the following day Mrs. Theodore Havemeyer, donor of the famous Havemeyer lilac collection, came to the Garden.

Dr. Lindsay S. Olive, mycologist, newly appointed member of the botany staff at Columbia University, spent the day at the Garden Sept. 20 with Mrs. Olive.

Among other visitors of recent weeks have been Dr. R. Lemberg, Medical Research Council, Sydney, Australia; Capt. Dr. Ram Singh, Patiala, India, who is with the United Nations, and Jasevant Kaur of Patiala, a law student at Fordham; Dr. E. S. Schultz of the Bureau of Plant Industry in Washington; Dr. Theodore Zucker, Columbia College of Physicians and Surgeons; Dr. A. J. Sharp, University of Tennessee; Dr. Cynthia Westcott, Glen Ridge, N. J., and Dr. Geneva Sayre, who is on sabbatical leave from Russell Sage College this year.

New Yorker. William F. Drescher, night watchman in the Garden's museum building and author of the article on "Birds at the New York Botanical Garden" in the Journal for last June, is the subject of two columns written by Geoffrey Hellman in the Talk of the Town column of the *New Yorker* magazine for Oct. 14. The article deals principally with the bird feeding station which Mr. Drescher maintains near the rock garden in wintertime.

Army Film. G. L. Wittrock assisted the U. S. Army for several days in early October in the filming of scenes and materials at the New York Botanical Garden to complete a motion picture on survival in Alaska.

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PUBLICATIONS OF THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

An Illustrated Flora of the Northern United States and Canada, by Nathaniel Lord Britton and Addison Brown. Three volumes, giving descriptions and illustrations of 4,666 species. Second edition, reprinted. $15.

Flora of the Prairies and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex by K. K. Mackenzie. From Vol. 19, Part 1, of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marion A. & G. L. Wittrock in the Journal for March 1942. 15 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal. 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 15 cents.

The Flora of the Unicorn Tapestries by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second edition 1947. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at the New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts by E. J. Alexander. 64 pages, indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. 50 cents.

Review of Juniperus chinensis, et al by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.

Periodicals

Journal of The New York Botanical Garden, monthly, containing news, book reviews, and non-technical articles on botany, exploration, and horticulture. $1.50 a year; single copies 15 cents. Free to members of the Garden. Now in its 50th volume.

The Garden, a quarterly, designed to stimulate the laymen's interest in the world of plants and the science of plant life through articles written in popular vein. $2 a year in the United States; all other countries, $2.50. Published by the Garden's Manhattan office at 801 Madison Avenue, New York 21, N. Y. Now in its first volume.

Addisonia, devoted exclusively to colored plates accompanied by popular descriptions of flowering plants; eight plates in each number, thirty-two in each volume. Now in its twenty-second volume. Published irregularly. Subscription price, $10 a volume. Not offered in exchange. Free to members of the Garden.

Mycologia, bimonthly, illustrated in color and otherwise; devoted to fungi, including lichens, containing technical articles and news and notes of general interest. $7 a year; single copies $1.50 each. Now in its forty-first volume. Twenty-four Year Index volume $3.

Brittonia. A series of botanical papers published in co-operation with the American Society of Plant Taxonomists. Subscription price of volumes 1 through 5, $5 a volume ($4 to members of the Society). Now in its seventh volume. Price, $7.50 ($5 to members of the Society).

North American Flora. Descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 97 parts now issued. Not offered in exchange. Prices of the separate parts on request.

Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

Memoirs of The New York Botanical Garden. A collection of scientific papers, 1900-1927. Contents and prices on request.

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

DECEMBER

1949

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ASSOCIATION OF
PLANTS AND MINERALS

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CHRYSANTHEMUM SHOW
WITH ABSTRACTS
OF PAPERS ON
CULTURE AND
PEST CONTROL

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VOL. 50 No. 600

ENTS $1.50 A YEAR

CALADIUM FLOWER AND LEAVES

BY JOHN P. ROCHE

DECEMBER EVENTS AT THE GARDEN

Museum Exhibits

Trophies of the Venezuelan expedition from which Dr. Bassett Maguire brought back specimens of the blowgun bamboo used by the Maquiritare Indians have been installed in cases on the main floor of the Museum Building. The exhibit includes, in addition to the blowguns themselves and the poisoned darts which are used in them, curare poison and the plant from which it is obtained, paddles, torches, various baskets, decorative ornamentation worn by natives, and food utensils.

During December the Bronx Artists' Guild will have its annual exhibition in the rotunda.

Specimens of *Strophanthus,* the plant whose seed is the newly discovered source of cortisone, which gives promise of bringing relief to sufferers from arthritis and other diseases, will be on view in the rotunda during December and January.

Conservatory Displays

Poinsettias in white and pink as well as the customary red will be one of the features of the Christmas display in the Conservatory, to be opened to the public Dec. 23. There will be numerous other plants appropriate to the season, some with decorative fruits, such as *Ardisia* and the so-called "Jerusalem cherries" (*Solanum Pseudo-Capsicum*). The Conservatory is open to the public daily, including Sundays and all holidays, from 10 a.m. to 4 p.m.

Free Saturday Programs

3 p.m. in the Lecture Hall

Dec. 3 ***Plants and Birds in the Winter Garden*** — *Alfred E. Runk*
A motion picture in natural color — Ramsey, N. J.

The winter program will begin Jan. 7 with the showing of two Alaskan motion pictures from the U.S.D.A. Forest Service—"Tongass Timberland" and "Timber and Totem Poles."

Members' Day Program

Dec. 1 at 3 p.m.

At the New York Genealogical Society's headquarters, 122 E. 58th St.

Plants of the Bible — *Dr. Harold N. Moldenke*, Curator

Educational Program

The class in Outdoor Flower Gardening, in the Two-Year Course in Practical Gardening commences January 5. Other subjects to follow on Jan. 9 and 10 are Systematic Botany Laboratory and General Botany II, in the Two-Year Science Course for Gardeners, and a new class of eight Tuesday afternoon lessons in Elementary Botany, commencing Jan. 10.

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JOURNAL

of

THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 50 DECEMBER 1949 NO. 600

Association of Plants and Minerals

By Leonard J. Buck

WHEN just out of college, with a mining engineering degree and with a fund of information obtained in the mineralogy classroom of Dr. Edgar T. Wherry (who is now a well-known member of the Botany Department of the University of Pennsylvania), I was sent to Cuba to visit some iron and chrome ore properties.

During inspection of one of the mines, an uneducated miner approached the general manager and inquired whether he would like to have a new chrome ore deposit. While the local superintendent tried to dismiss the man, the native became obstinate and insistent, and after considerable conversation it was agreed to equip him for a prospecting trip. He was given four men, two donkeys, and enough supplies for three weeks. All wished him luck in his search but I must admit there were doubts expressed about ever seeing him again. The incident became a source of amusement in the mining camp, and every engineer wanted a few men and some donkeys to take a "like holiday."

After three weeks the miner had not returned. We thought of sending out a searching party, but gave up that idea as impractical since the native had refused to tell his direction or his destination. But as you must have guessed, he not only returned, but announced that he had found the chrome ore he was looking for. As we had co-operated that far, we decided to accompany him to inspect his find. Much to everyone's amazement there actually was a deposit of good quality, which later proved to be a large and excellent one.

On questioning, the native told why he had chosen that particular spot. His explanation was that in the mine where he was working he had noticed a certain shrub growing better than among the adjacent rocks. Consequently, in his search he looked for the same plant growing in an equally luxuriant manner. Needless to say, this was an awakening

experience for me, and since then I have been interested in the possible association of minerals and plants as a means of determining worthwhile mineral deposits. For instance, in Venezuela a terrestrial orchid, believed to be *Epidendrum O'Brienianum,* has been helpful in the determination of the extent of an iron ore body. The orchid grew in profusion up to the periphery of one of these now well-known large iron ore deposits but did not appear on the surrounding soil and rocks.

Delving into history, we find an association of plants and minerals recognized in the following account which comes from Columbus's ship-log on his voyage to Cuba.

It seems upon his arrival it was imperative to replace a ship's mast. The question was where to find the most suitable wood. One of his fellow explorers recommended building a mast from some pine trees which he had noticed growing along the north shore of the island. He identified the location further by telling Columbus the trees were growing in red soil that seemed to have a high iron content. This area is now an iron ore mining district in Cuba.

Throughout the world, geologists and mining engineers have had experiences such as these and some articles have been written on the subject. In August 1948, Circular No. 28 was published by the United States Department of Interior on the "Annotated Bibliography of Papers on Geochemical Prospecting for Ores," compiled by Dr. H. E. Hawkes. Dr. Hawkes is Acting Chief of the Geochemical Prospecting Unit of the United States Geological Survey and is now engaged in a program of research on geochemical and geobotanical methods of prospecting for ores. This is a broad program, but part of it is concerned with botanical indications of buried ore deposits through a study of the chemical and biological response of growing plants to unusual quantities of certain elements in the supporting soil.

There are no doubt many men in the United States who are interested and concerned with this subject today. Dr. K. Rankama of the University of Chicago wrote an excellent article in the June 1947 issue of *Mining and Metallurgy.* Dr. Wherry has long been interested in this subject although he disclaims ever having written anything of importance on it. However, I remember reading a brief article by him in a technical journal some thirty years ago which encouraged me to continue my study of the association of plants and minerals.

Various governments and private groups abroad are engaged in this study. In our neighboring Canada, a biogeochemical prospecting organization has published articles on its findings in the Bulletin of the Geological Society of America.

In Sweden, considerable work has been done, but with only negative results, for it seems that geobotanical surveys as heretofore conducted

are applicable only in regions which have not been glaciated. In non-glaciated regions, the soil is more likely to be derived from the rocks immediately underneath, and thus retains some chemical characteristics of the substratum. However, in glaciated countries, the overburden has often been transported over long stretches, frequently many miles, and thus has no relation to the immediately underlying formations.

The first publication about these questions in Sweden was, so far as I know, made by Harry von Eckermann, who had noticed that phosphorus frequently was introduced from an unknown source into the iron in the furnaces. A close study revealed that the phosphorus originated from charcoal (produced from an adjoining forest) which was used in the furnace. It further developed that the soils of certain of the forest areas were phosphoriferous and also that the content of phosphorus in the trees varied during the different seasons.

Elis Dahlstrom, now Chief Geologist of one of the largest mining companies in Sweden, however, does believe from the work they have done that geobotanical methods of prospecting could be applied also in glaciated countries, at least in areas where the overburden is fairly thin or where the morainic material has not been transported far.

In Finland, some excellent results have been reported in prospecting for nickel, making use of its apparent connection with a certain plant.

In 1937 (*Der Biologe,* Vol. 6), Paul Dorn of Germany described a number of his experiences with the association of certain plants and minerals, not only in Germany, but in Czechoslovakia, Poland, Brazil, Australia and Spain as well; and he even made reference to platinum deposits in the Transvaal in South Africa. In the last case, however, it was not a question of the association of any one chemical element with a particular plant, but the fact that the area was essentially devoid of vegetation, which brought this deposit to the attention of geologists.

For some years, the Russians also have done work along these lines, and published articles on the subject from time to time. However, it would appear that they have laid stress on the chemical analysis of the ash of the plant, rather than on geobotanical surveying.

The following table gives a list of some metals or minerals and indicates specific plants which are said to be associated with them in various countries:

Metal or Mineral	***Plant***	***Country***
COPPER	Caryophyllacae (Pink Family) *Mielichhoferia nitida* (a moss) *Scopelophila liguta* (a moss) *Arenaria verna*	Australia and Queensland
COPPER	*Lychnis alpina* *Lychnis dioica*	Norway
COPPER	*Silene* (various species)	United States

Metal or Mineral	*Plant*	*Country*
GOLD	*Cecropia laetevirens* and other species	
	Typha latifolia	Brazil
IRON	*Epidendrum O'Brienianum*	Venezuela
IRON — PYRITE AND ARSENOPYRITE	*Calamagrostis*	Finland
LEAD	*Tussilago Farfara*	Germany
LEAD SULFIDE	*Amorpha canescens*	United States
MERCURY	*Alsine setacea* (*Arenaria setacea*)*	India
PHOSPHORUS	*Convolvulus althaeoides*	Spain
SILVER	*Eriogonum ovalifolium*	United States
TIN	*Gnaphalium suaveolens* (*Pluchea Quitoc*)	Brazil
ZINC	*Thlaspi calaminare* (*T. alpestre*)	Germany
ZINC	*Thlaspi* (various species)	Sweden
ZINC CARBONATE	*Thlaspi calaminare* (*T. alpestre*)	
	Thlaspi rotundifolium var. *cepaeifolium*	
	Viola calaminaria (*V. tricolor*)	Austria
ZINC CARBONATE	*Ruta graveolens*	
	Matricaria?	
	Senecio brasiliensis	Brazil
ZINC CARBONATE	*Viola calaminaria* (*V. tricolor*)	Poland
ZINC CARBONATE	*Populus deltoides*	
	Ambrosia artemisiaefolia (*A. elatior*)	
	Ambrosia trifida	United States
ZINC SILICATE	*Viola lutea* (*V. maculata*)	Belgium

General conclusions, however, cannot be drawn from the above table because the mere presence of certain plants does not necessarily indicate the abundance of a certain mineral. For example, there are instances where a plant is known to grow luxuriantly in a zinc-rich substratum in one country and yet will not grow at all well in zinc-bearing soils of other countries. It may grow even more favorably in the surrounding soil, which may be almost devoid of the mineral in question, because of other factors. For example, some plants have the ability to concentrate in their leaves, flowers or roots a relatively high percentage of certain elements from soils where these elements are present only in trace quantities. It seems reasonable, however, to believe that a plant will grow best where there is present more than an average amount of the metal which that plant is able to concentrate, provided other conditions are favorable for its growth.

The major difficulty in using geobotanical surveying in a practical way is that even though a plant does indicate the presence of some particular mineral or element, it cannot tell us whether that substance is present in sufficiently high concentration to be commercially workable. Accordingly, it would seem that a sound approach to the recognition

* Names in parentheses are the names accepted by botanists today for the plants in question, where the original reference contained a botanical name no longer in use.

of a worthwhile ore deposit lies along the direction of analyses of soil rather than of plant ash.

As is apparent from the preceding paragraphs, the study of the association of plants and minerals is still in its infancy. There has been little correlation of the experiences of qualified observers throughout the world and no general summary has been published, so that much work remains to be done. It is an intriguing and fascinating study and one which I hope will be pursued further. Through the co-ordinated effort of botanists, horticulturists, chemists, geologists and mineralogists, it may become an exact science and thereby increase our known mineral resources.

While we must look to the above five scientific groups for a sound technical development for increased knowledge of this subject, there still remains the possibility that a keen observer, like the Cuban miner, with a love of plants, may be the discoverer of a new mineral deposit.

'Mum Show Brings Record Crowds to Garden

WITH 45,000 visitors at the Garden over the long week-end which began with the opening of the annual chrysanthemum show the afternoon of Friday, Oct. 21, all former attendance records were broken. By those who had witnessed previous shows it was generally agreed that this year's event exceeded in horticultural quality of displays as well as in attendance all other chrysanthemum shows staged at the Botanical Garden. The outdoor borders, part of the Garden's permanent displays near the Conservatory, were at the peak of perfection during the event, and the trial border of new varieties, contributed by fourteen growers* attracted much attention too.

All but a few of the chrysanthemums in the competitive exhibits had been grown outdoors. The classes included sprays, single blooms, pot plants, sports and seedlings, and arrangements, in addition to the gardens which occupied the rotunda of the Museum Building. There were also two competitions for children, one staged by the Chrysanthemum Society and one, which was opened Saturday in the basement corridor, arranged in co-operation with the Board of Education.

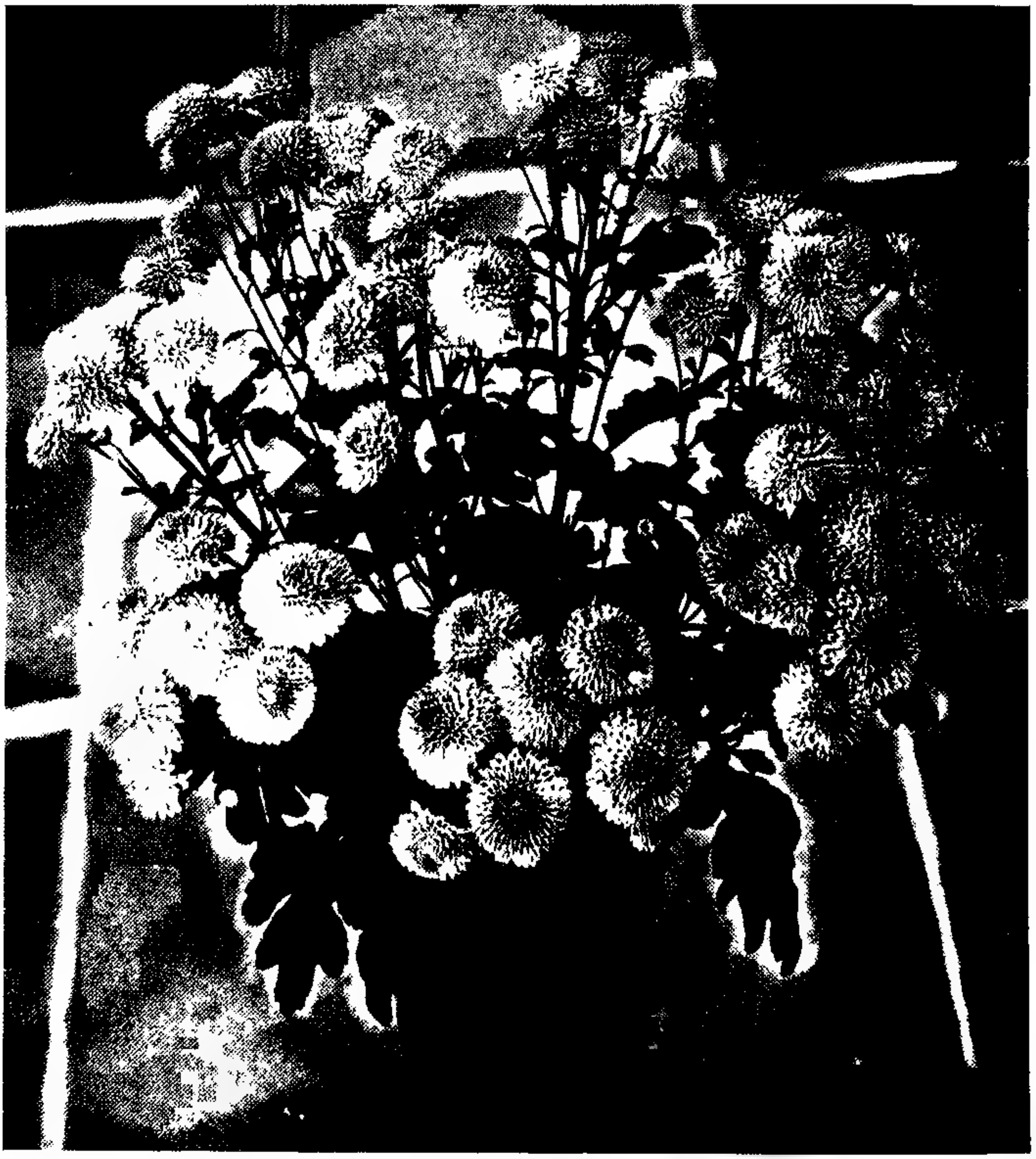
Prizes and Special Awards

This was the fifth consecutive show put on at the Garden by the National Chrysanthemum Society and the sixth in the history of the organization. There were around 200 competitors in more than 60 classes. For the displays in the rotunda, first prize was awarded to the North Jersey chapter of the N.C.S. for a garden set up by Mrs. J. J. Kirchhof of Joppa, Md., assisted by Charles L. Tyrrell of West Englewood, N. J., the society's President. Second prize went

*Bristol Nursery, Omar Coles, Sr., Conard-Pyle Co., A. E. Curtis, V. R. de Petris, Jackson & Perkins, Lehman Gardens, Mrs. Lewis Mack, H. Roy Mosnot, J. J. Styer & Son, Totty's, Wayside Gardens, University of Minnesota, U. S. Department of Agriculture.

to the Montvale (N. J.) Garden Club for which Mrs. Chester Burt arranged a garden, assisted by Mrs. Clinton De Baun; and third prize to the Chrysanthemum Group of Mamaroneck, N. Y., for a display created by Mrs. Henry Kincaid. The fourth garden was a non-competitive display by Stuber Brothers of Yonkers.

Near the entrance, fifteen tall potted chrysanthemums of different varieties set against a picket fence won a first prize and a silver medal certificate for Dr. & Mrs. Ernest L. Scott of Bogota, N. J. The Scotts also won the Carl Toepler cup for the best potted specimen, with a spider variety named ***Bess Witt.*** Mrs. Theodore H. Joseph of



"Edith Roberts" is the name of this newly christened flower, which honors one of the National Chrysanthemum Society's most ardent workers, Mrs. John W. Roberts. Grown by Baur-Steinkamp, this was one of two seedlings given an award of merit by the judges this year.

Third place among the gardens featuring chrysanthemums at the annual show at the New York Botanical Garden was awarded to the Chrysanthemum Group of Mamaroneck, N. Y., for the garden shown at the top. Second prize went to the Montvale (N. J.) Garden Club for the garden pictured below, with a small raised pool at the side.

Mamaroneck, N. Y., won the Scott cup and tricolor award for the best single bloom with the large yellow variety, ***Elsie***.

Among the flower arrangements, the special award offered was the Emma Hodkinson Cyphers cup for distinctive originality and emotional content, and this went to Mrs. Simeon T. Shields of Montclair, N. J., for an arrangement of white gladioli and autumn leaves in a driftwood container, entered in the invitation class for shadow box compositions based on the theme: "And when your heart is touched with grief, find solace in the tinted leaf."

Two New Seedlings Christened

For the first time in five years the

Mrs. Vance R. Hood, chairman of the show, was honored when the pink De Petris seedling shown above was named "Elizabeth Hood" at a brief ceremony during the chrysanthemum show.

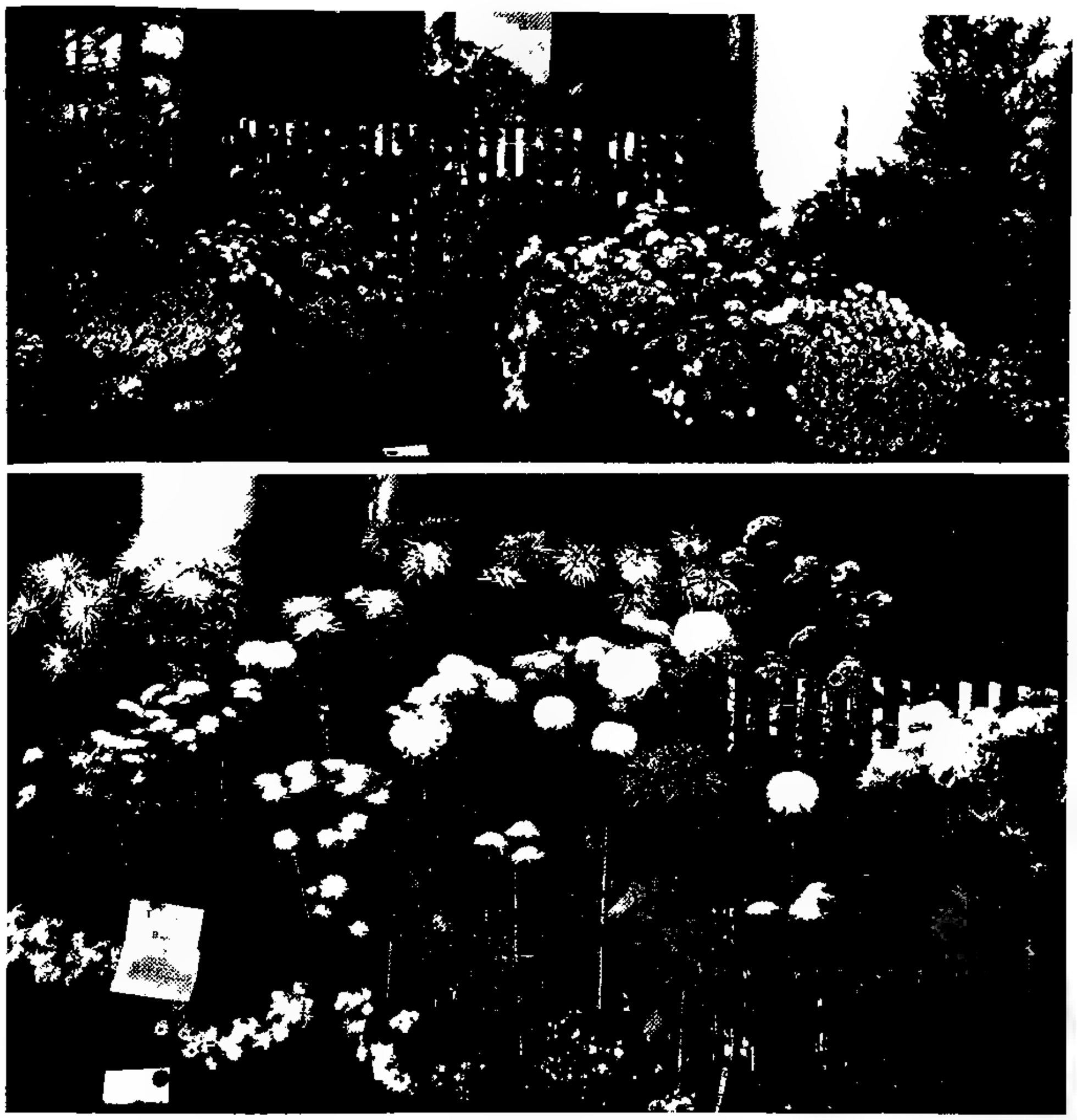
award of merit for new seedlings was given by the show's judges. A scoring of 85 points or more is required by the rules, and two new seedlings met this standard this year. Taking first place was a small pink pompon developed as No. 12,140 by Baur-Steinkamp, Inc. of Indianapolis, and flown to the show. This was officially named ***Edith Roberts*** for Mrs. John W. Roberts of Mamaroneck, who, as the first elected vice-president of the society and an active worker in its show every year, has contributed greatly toward its success. Mrs. Roberts also has probably won more prizes for the quality of the flowers she has grown than any other competitor, and she is recognized as a prime mover in the resurgence of chrysanthemum culture by amateur gardeners in recent years, particularly in Westchester County.

The second winner of the year's award of merit was a pink, informal garden type of flower, seedling No. 1210, developed by Vincent de Petris of Grosse Point, Mich. This was officially named ***Elizabeth Hood*** for Mrs. Vance R. Hood of Englewood, N. J., chairman of this year's show. Mrs. Hood, who is with the New Jersey Highway Commission, is also Secretary of the National Council of State Garden Clubs, Inc. The christening of these two varieties was done in a brief ceremony conducted by Carl Toepler, Secretary of the National Chrysanthemum Society, during the program in the lecture hall the opening day of the show.

Talks Published This Month

Abstracts of the two talks given on the program are appearing in this Journal. They were by Philip L. Robinson, landscape architect, of Great Neck, N. Y., who spoke on "Chrysanthemums to Complete the Home Landscape," and by P. P. Pirone, the Garden's Plant Pathologist, who talked on "Old and New Methods in 'Mum Pest Control." At the conclusion of the program Dr. Pirone showed his experimental plots, where work is being done on nematode control, to those who were interested.

Immediately following the tea which



The first prize winner for a chrysanthemum garden at the 1949 show of the National Chrysanthemum Society was the upper planting, which was arranged by the North Jersey chapter of the society. Beneath it is the collection of potted chrysanthemums which won a first prize and a silver medal certificate for Dr. & Mrs. Ernest L. Scott.

was given by the Garden late Friday afternoon for members of the National Chrysanthemum Society and of the New York Botanical Garden, the society had its annual meeting in the Members' Room. Mrs. Wirt Darrow, President of the Federated Garden Clubs of New York State, spoke on her horticultural work with hospitalized World War veterans.

Wang Chi-Yuan, whose chrysanthemum paintings were shown at the Garden during last year's show, presented a new display which included chrysanthemums painted on china.

Old and New Methods in 'Mum Pest Control

By P. P. Pirone

An abstract of the talk delivered at the
Annual Chrysanthemum Show at the New York Botanical Garden
October 21, 1949

HARDY chrysanthemums, like other popular plants, are unfortunately subject to a number of highly destructive animal and plant parasites.

Most destructive is the foliar nematode, a microscopic worm which blights the leaves, particularly during wet seasons. Up to recently, no effective control measure was known. For several years, now, the material SODIUM SELENATE, applied to the soil in which the 'mums are growing, has proved to be remarkably effective in preventing leaf infections by the worm. The chemical is taken into the plants through the roots and carried into the leaves, where it destroys any nematodes present and prevents them from breeding.

Directions for Eelworm Control

A stock solution of sodium selenate is first made by dissolving 3 1/3 ounces in a gallon of water. One quart of this is then added to 25 gallons of water to treat 100 square feet of soil (one quart to one square foot of soil).

Best results are obtained when stock or mother plants are treated. One month after treatment, cuttings should be taken from such plants, rooted and grown on. The new plants will contain enough sodium selenate to protect the plants from nematode infections for one complete growing season.

Users of sodium selenate are warned that the material is *highly poisonous* when taken internally and that its poisonous effects persist in soils for a long time. For this reason food crops cannot be safely grown on soils previously treated with the selenate, for the leaves and fruits may absorb some of the poison.

Most fungus diseases of the leaves can be prevented by periodic spraying with FERMATE. Wettable sulfur and 50% wettable DDT powder can also be included with the Fermate to control most of the leaf-feeding insects and the mildew fungus.

Another Dangerous but Effective Chemical

The newest insecticide tested for 'mums is PARATHION. This is used at the rate of 1 pound of the 15% wettable powder in 100 gallons of water. It controls nearly all the common insects on 'mums in one or two applications.

This material is even more dangerous to handle than sodium selenate. *It should never be used indoors* without a good gas mask and proper protection of the body. Even for outdoor use, it is recommended only when the user is well acquainted with its dangerous qualities and when directions for use are followed to the letter.

Experiments with Nutrients

A more recent development, still largely in the experimental stage, has to do with feeding 'mums by spraying the foliage four or five times at weekly or ten-day intervals with a completely soluble, balanced nutrient solution. The old-fashioned way was to add the nutrients to the soil, where they were absorbed and moved to the leaves. The present method puts the nutrients, particularly nitrogen, directly in the leaves. Vigorous, deep green foliage develops on plants sprayed with a 23-21-17 commercial fertilizer at the rate of 1 pound in 28 gallons of water. This material can be included in the fungus and insect sprays mentioned earlier so that pest control and better foliage growth are achieved in one operation.

Chrysanthemums to Complete the Home Landscape

By Philip L. Robinson

TO the garden designer, who must consider any plant as material for the fashioning of a composition of many parts, the chrysanthemum is one of the most valuable of all perennial flowers. Nothing else produces such a massive display of blooms per plant, or in such a range of colors, and no other has such a long blooming period regardless of climatic conditions. In the event of an unseasonable frost, this flower alone saves our gardens from possible failure.

The chrysanthemum may be used in three ways:—as a seasonal filler, in mixed perennial borders, and as a bedding plant. When used as a seasonal filler among evergreens and shrubs it brightens a part of the home landscape which at this season may be devoid of much color. 'Mums are particularly effective against the strong green backdrop of broadleaf and coniferous evergreens. Here the yellow and light bronze varieties are particularly showy.

Chrysanthemums have long been used in mixed perennial borders. Here they grow among other perennials as clumps and take their turn in furthering the parade of seasonal color. Properly used in groups of three or more plants of one color, the effect is far superior to the spotty effect of scattered single plants.

Lastly and most effectively, the chrysanthemum is used as a bedding plant. This use is carried to its highest point here in the Botanical Garden. You may say that the home gardener can not hope to duplicate such a massive showing. Let me assure you that it is all a matter of scale. In the small garden six plants of ***Avalanche*** can do the job which requires twenty-five plants here at the Garden. Since they bloom at a time and in a situation where they have no competition they are able to fill the eye completely, hence to make a strong impression.

Selection and Placing of Chrysanthemums

When chrysanthemums are used to create a picture the lighter, brighter colors are best. White, yellow, pink, lavender and salmon shades attract the eye more quickly and from a greater distance than do the reds, purples and deep bronzes.

If the effect is to be enjoyed from a certain vantage point such as a terrace, porch, or picture window, the lighter colors should be used at the farthest point. The nearer to the vantage point the safer it is to use the deeper colors. A dark red like ***The Moor*** may be visible — or maybe I should say noticeable — only up to fifteen feet away on a dull cloudy day. Strangely enough, ***Chippewa*** — a purple — has great brilliance in sunlight and can be used up to seventy-five feet.

In small gardens scale is important and applies to the size of bloom as well as to the size of the plant. I prefer the buttons, singles, anemones and spoons in very small gardens. And I prefer the cushions and medium tall varieties to those of greater height.

The strain originated by the late Alex Cumming is particularly effective in the small garden and in the middle ground of larger gardens. The de Petris and Kraus hybrids are often tall and stiff of stem, having been developed, I understand, for the cut flower trade. They are grand in the background and, of course, unexcelled for the cutting garden. The English hybrids and commercials are not to be considered as garden subjects.

Growing Plants for Mass Effects

For best quality I recommend fresh plants grown each year from cuttings. Except for certain varieties, clumps are not satisfactory; they grow too tall and leggy in spite of pinching. Cushions are exempted from this stipulation.

Where possible I use cuttings, lining them out in rows in the vegetable garden or other available area. Here they are fed, sprayed, and cultivated like other crops, and pinched and *pinched* and ***pinched!*** You must remember that we are after a mass of bloom rather than specimen blooms. Pinch to keep the plants low in stature; pinch to promote breadth, and pinch to produce a profusion of bloom.

The plants stay in the "nursery" until they are needed. If transplanting

is done on a cloudy day or late in the afternoon there will be little if any setback.

It has been said that a properly grown garden chrysanthemum needs no staking. If so I have never seen any — barring cushions. When grown in solid beds the plants are best supported by birch brush as done here at the Garden. Otherwise it seems necessary to use inconspicuous wire or green bamboo stakes and green string or raffia. If staking is not done you will awake some windy, rainy morning and find your best plants with muddy faces and tangled stems. To correct this condition before crooked stems develop is a herculean task.

Chrysanthemums of Ten Colors

Below is a list of varieties which I have found to be satisfactory when handled correctly — that is, pinched and spaced properly. This does not mean that many other varieties may not be as good or better; but within my own experience, these are among the most reliable of the chrysanthemums to grow as bedding plants, to augment perennial borders, or to use as seasonal fillers in front of shrubbery.

White: ***Avalanche, Calcite, North Star***
Yellow: ***Charles Nye, Yellow Spoon, Summertime***
Pink: ***Pink Radiance, Allegro, Heatherbloom***
Salmon: ***Olive Longland, Mrs. du Pont***
Lavender: ***Lavender Lady, Lavender Lassie***
Orange: ***Autumn Lights, Apricot Glow***
Light bronze: ***Mme. Chiang Kai-Shek, Burma***
Dark bronze: ***My Lady, Cydonia***
Purple: ***Chippewa, Trojan***
Red: ***Aviator, Red Ridinghood, Korean Princess***

MR. Robinson, who is a member of the American Society of Landscape Architects, addressed nearly 200 people in the Garden's lecture hall on the opening day of the program and show given in co-operation with the National Chrysanthemum Society Oct. 21-23. An abstract of his talk on "Chrysanthemums to Complete the Home Landscape" has been given above.

Gifts to Library

RARE and highly valued books are included in several recent gifts to the New York Botanical Garden's library.

Mrs. T. A. Havemeyer, who has presented the Havemeyer lilac collection to the Garden within the past year, has followed this gift with a selection of books from her husband's library, among which are Humphrey Repton's elephant folio on "Designs for the Pavilion at Brighton" with colored cutouts inserted to give before and after views; "Observations on the Theory and Practice of Landscape Gardening," also by Repton (1803); two volumes by W. R. Dykes — "The Genus Iris" and "Notes on Tulip Species"; two books by E. H. Wilson, several by John C. Loudon and Jane Loudon, and "The Genus Rosa" by Ellen Willmott.

From the library of the late J. E. Spingarn, Mrs. Amy Spingarn has presented the Garden with a collection of

books which include such authors as Loudon, Cobbett, Burroughs, Markham, Correvon, and Bowles. Among them is Joseph Breck's "New Book of Flowers" published in 1866. The Spingarn collection of literature, illustrations, notes, and correspondence on the genus *Clematis* was given to the Garden in 1940.

Mrs. Helen M. Fox, who a few months ago gave the Garden a valuable collection of horticultural works from her own library, has since added the gift of one of the 125 copies of her own translation of "A Delectable Garden" by Bernard Palissy, published in 1931 by the Watch Hill Press in Peekskill, N.Y.

John Hendley Barnhart ***Mrs. Arthur H. Scribner***

ON NOV. 11, word came to the New York Botanical Garden of the death that morning of Dr. John Hendley Barnhart, Bibliographer Emeritus, who had been a member of the staff since 1903. A tribute to Dr. Barnhart will be published early in the new year.

Two days earlier occurred the death of Mrs. Arthur H. Scribner, a former chairman of the Advisory Council. A review of Mrs. Scribner's career as it concerned the New York Botanical Garden will also appear in an early Journal.

Martha Prentice Strong

CLOSE to the century mark in years, Martha Prentice Strong of 850 Park Ave., New York, the widow of Theron G. Strong, died at the home of her son in Southport, Conn., Oct. 28. She had been both a life member and an annual member of the New York Botanical Garden since 1916. Mrs. Strong was also a member of the Corporation of the Botanical Garden from 1931 on, and of the Advisory Council since 1918, when it was known as the Women's Auxiliary. She was secretary from 1921 to 1926.

Throughout her long life, horticulture and botany had been among her leading pursuits. During her early years of botanical study, Mrs. Strong was in close touch with Drs. N. L. Britton, Asa Gray, Charles H. Peck, and other botanists of the day. She was active in the Torrey Botanical Club from 1885.

Her contributions to horticultural literature covered a period of 37 years, beginning with an article entitled "Growing Strawberries by the Sea" which appeared in *Country Life in America* in February 1912. Other articles included "The Winter Care of Dahlias" — *House and Garden,* September 1914; "The Plane Tree" and several other papers which appeared in the Bulletin of the Garden Club of America, and "Cacti in the Northeast" — Journal of the New York Botanical Garden, May 1939. In 1946 she wrote and published for private distribution the "Saga of 1 Grace Court," a descriptive history of the family.

In 1933 the Garden Club of America honored Mrs. Strong for her horticultural achievements by presenting a bronze medal to her.

An article entitled "Landmarks of a Gardener's Lifetime," which she contributed to the January 1949 issue of the Bulletin of the Garden Club of America, reviewed the years since her birth in Brooklyn on January 3, 1851, during which gardening had always played an important part. Her earliest recollections were of the fruits and flowers that were grown by her father at their home in Brooklyn Heights, of the night-blooming cereus, camellias, and other plants which flowered in their greenhouse, of the elms along the street, the weeping beech, the magnolia and tamarisk which framed the view over New York Harbor. One of the elm trees planted by her father, John Hill Prentice, in 1850 still survives on Grace Court.

Gardening became her first occupation when at the time of her marriage in 1878 she moved to Manhattan. To her back yard at 38 West 52nd St. she brought living color with flowering shrubs, vines, and annuals. Twelve years later, extensive planting was begun at a small estate called "Fair Acres" on Long Island. Here, she wrote, was where she "learned the value of tree and shrub screens and hedges for seclusion, with varied sky lines; the all-year importance

of evergreens of varied contours and diversity of coloring, and for *accent!* — long open vistas and central lawns; varied shades of green with restraint — in colored shrubs and trees, the use of graceful vines; necessity of shade and charm of shadows: the spiritual beauty of water in the scheme, with ultimate harmony in blending all the parts to the whole composition and environment."

These lessons, so well learned, were carried out again at "The Dolphins," which became her summer home at East Hampton in 1898. Though only three minutes' walk from the Atlantic ocean, in a spot which was beaten regularly by the winds, she succeeded in establishing one of the finest small collections of conifers in the East, and within the protecting branches of these evergreens, a garden of distinctive charm.

The pinetum was started with seedlings often no more than three inches high, dug from the western forests and elsewhere, often high in the mountains, when accompanying her husband on fishing trips. From the first seedling, planted in 1911, the pinetum grew into a beautifully landscaped area in which some of the trees reached mammoth size. Many of them were stripped and laid low by the hurricane of 1938; yet that autumn and the following summer found Mrs. Strong, at 88, busy with pruning shears and plans for replanting.

A collection of cacti and other succulent plants was added to Mrs. Strong's horticultural ventures at "The Dolphins" after an airplane trip to Arizona in the spring of 1936. Wherever she went, she undertook concentrated studies of the native flora of the region, and attempted cultivation of the species which interested her, after her return.

Another of her absorbing horticultural interests was the daylilies developed by Dr. A. B. Stout. From the first, she was enthusiastic over them, and for more than twenty years she maintained a collection of named varieties at "The Dolphins." In 1941, this collection of more than 100 kinds was transplanted to the old Clinton Academy (now a museum) in East Hampton, where it will be maintained by the Garden Club of the town. The name "Theron," in memory of her son, was given by her to the first dark red clone of *Hemerocallis* developed by Dr. Stout, at his invitation. Her own name is to go on one of Dr. Stout's recently developed reds.

When a few years ago Mrs. Strong made her apartment on Park Avenue, where she had lived in winter since 1925, her year-round home, her gardening activities continued unabated. Raising seedlings in her window among her decorative potted plants (one of which she had had ever since her marriage), she took over most of the roof of the apartment house and established there one of the finest roof gardens in New York City. Ugly fixtures were masked with blossoming vines; bulbs flowered early in beds of greenery, shrubs and small trees put out their leaves and flowers in season, annuals that she had raised herself bloomed all summer long, and chrysanthemums that she propagated carried the flowering season well into November. In winter the garden was a bower of evergreens, among which she took a daily walk except in the most severe weather. Throughout most of the year she had afternoon tea served to her in the rooftop garden.

Until the past summer, when her hip was broken, Mrs. Strong did all of her own gardening work, except for heavy lifting and the mowing of the miniature lawn.

Mrs. Strong's interests, however, were by no means confined to horticulture. Over many years she was active in numerous educational, religious, charitable, historical, and patriotic organizations, as well as in the Garden Club of America, the International Garden Club, of which she was an honorary member, the Garden Club of East Hampton, and the New York Botanical Garden.

In a direct line of descent, there are four generations, including the oldest son, Prentice Strong, of Southport, Conn., surviving Mrs. Strong. Her husband, who was a lawyer and author, died in 1924. Their son, Theron R. Strong, died in 1931, and their daughter, Martha Prentice Strong (Mrs. Harold McLeod Turner), also for many years a member of the New York Botanical Garden, died in 1945.

Funeral services for Mrs. Strong were conducted at the Brick Presbyterian Church, of which she had been an active member for many years, serving on the board of managers for a quarter century.

NOTICES AND REVIEWS OF RECENT BOOKS

Priest and Pioneer In Exploring Nature in China

ABBE DAVID'S DIARY. Translated and edited by Helen M. Fox. 302 pages, illustrated. The Harvard University Press, Cambridge, Mass., 1949. $5.

Any diary should be read because of interest not only in the person writing but in the life he led within the circle of his experiences. It is a happy thing for us that there is a charming biographical sketch of the Abbé before the actual texts of the diaries are given, for this lends a color to the whole that might not emerge so clearly if we had only the latter, since at times they are almost stark in their narration.

Since the Abbé was essentially a naturalist his interests did not confine themselves entirely to plants, and indeed the greedy gardener of today could even wish that there were less of birds and beasts and insects in the collections and more of plants. But the wonder of the whole thing is the fact that for the first time in all history parts of China and Mongolia were being seen by an outsider, a European well trained with a passion for knowledge and a sharp and critical eye, vividly aware of the splendor of what he was seeing and eager beyond telling to communicate it to his beloved friends and sponsors at home. To those of us for whom that rare experience of seeing something for a "first" time can never be a personal one, it is a stimulating business to read on and on.

Since China had been open to "foreigners" only some twenty years, travel was not simple, accommodations and food were such that only a disciplined person could have continued — and in health — as well as he. That his religious training had accustomed him to a simplicity of thought and action was enough to make him pre-eminently one to carry out the trips he made. For him the rich harvests in science were one of the many revelations of the glory of God. There are times when his patience is sorely tried and there are times when he does not cloak with charity all that might have been so relieved, but again he was of his era.

If we approach these diaries from any point of view, they make good reading. But if as gardeners we read them, above all else we should have a renewed sense of our obligations to the past and to that great army of plant-loving souls who have kept in cultivation all the wonderful things from all over the world, not only those who first brought them "home" but those who have kept them alive, thriving and current. To the Abbé and some of his later fellow missionaries we owe greatly.

The illustrations are reproductions of Chinese paintings save the illustration of the Abbé himself. Birds, beasts and insects figure in them as well as plants. Authorities in their several fields have aided Mrs. Fox in the naming of all so that it seems presumptuous that a mere reviewer should object to two of the plant names, but he is quite certain that the plate labeled "Grasshopper and Magnolia Blossom" shows a gardenia, for no magnolia has such a calyx, and the plate for "Blossoming Helianthemum" can be only a hypericum, in which China is rich.

It would be splendid if the reviewer could say that he has read the originals in French and so praise intimately the excellences of Mrs. Fox's translations. He could not so read them with ease, but he is keenly aware of the fluency of the style, of the appearance of personal manners of expression, and adds his gratitude for the good translation as well as his indebtedness for having the diaries now at his easy command.

They should be read by any gardener who feels his sense of indebtedness to the garden world. They should be read by any person who is about to embark on exploration and collection as a pattern of simplicity.

B. Y. Morrison.

Wayside Gardens

SUTTER'S GOLD

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There are many splendid and beautiful new varieties at Wayside this year . . . exclusive introductions so delightfully different and unusual, you will want to know all about them.

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18 exciting new perennials—all guaranteed superior "Root-Strength" plants available only at Wayside.

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Two New Border Pinks. *Dianthus Evangeline* (soft persian rose) and *Dinah* (deep persian rose—maroon center) flower profusely spring and fall. 8 to 10" tall. Spicy fragrant.

Shasta Daisy, *White Giant*. Completely double new variety resembling a white pompon. Flowers 2½" in diameter, opening layer upon layer to about 1½" deep.

1950 ALL-AMERICA ROSE SELECTIONS

Mission Bells. Hybrid Tea. Deep salmon-pink buds become dazzling shrimp pink when open. Vigorous plants have large, heavy textured flowers of great charm. Very hardy.

Capistrano. Rich, deep, glowing rose-pink hybrid tea that retains its brilliance. Robust, disease-resistant plants bear huge, velvety flowers on long stems.

Sutter's Gold. Gleaming new hybrid tea whose silky, golden petals are copper veined. Sturdy plants produce a profusion of stunning flowers that are ideal for cutting.

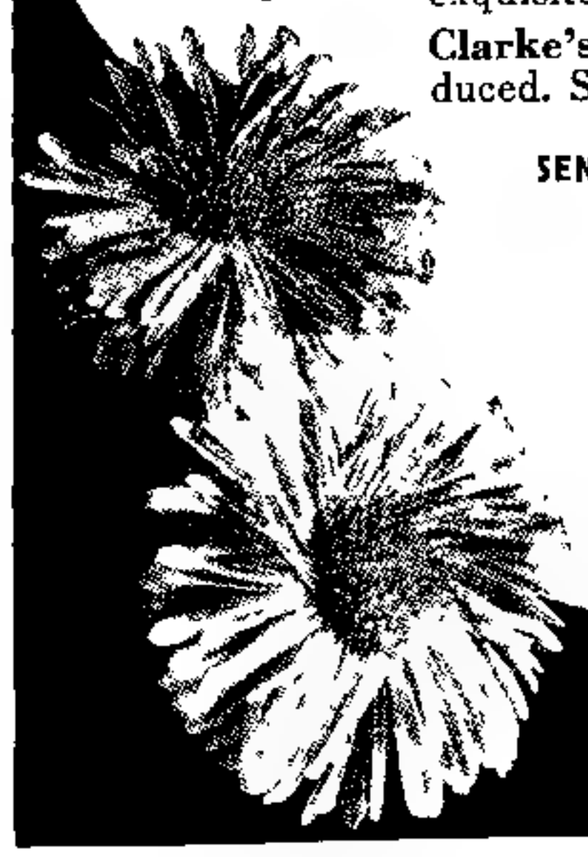
Fashion. Fascinating new floribunda of coral-pink overlaid with gold. Bushy 3′ plants have large clusters of fragrant, 3½" blooms of clear coral. A rose of amazing vigor.

Lovely new LILACS

Esther Staley. Finest pink tinted lilac—decided improvement over rare, so-called pink "Lucie Baltet". Vigorous plants bear exquisite, moderately large, single blooms of La France pink.

Clarke's Giant. The largest and finest lilac ever to be introduced. Soft, gentian blue flowers, 12 inches or more in length.

HARDY ASTER
Plenty



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Almost 200 pages, with hundreds of flowers illustrated in their natural colors. Thousands of gardeners rely on this book, year after year, as their source book of ideas and the finest worthwhile new plants. Complete cultural instructions for each item. To be sure you get your copy it is necessary that you enclose with your request 50¢, coin or stamps, to cover postage and handling costs.

51 MENTOR AVE. MENTOR, OHIO

Wayside Gardens

Gardening, With Nature's Help

CREAM HILL. Lewis Gannett. 191 pages, 8 lithographs by Ruth Gannett. Viking Press, New York. 1949. $3.50.

The Gannett family of Cream Hill (a locality to be found on any detailed map of northwestern Connecticut), are valued members of that modern sociologic phenomenon, the week-end commuter. Lewis Gannett is a well known book reviewer of New York City. If reading hundreds of books leads one to write so spontaneously, freshly, informally, and yet with the friendly calm authority of one who has much more knowledge to draw upon if necessary — then I recommend the profession for those who burden us with dry and unreadable treatises.

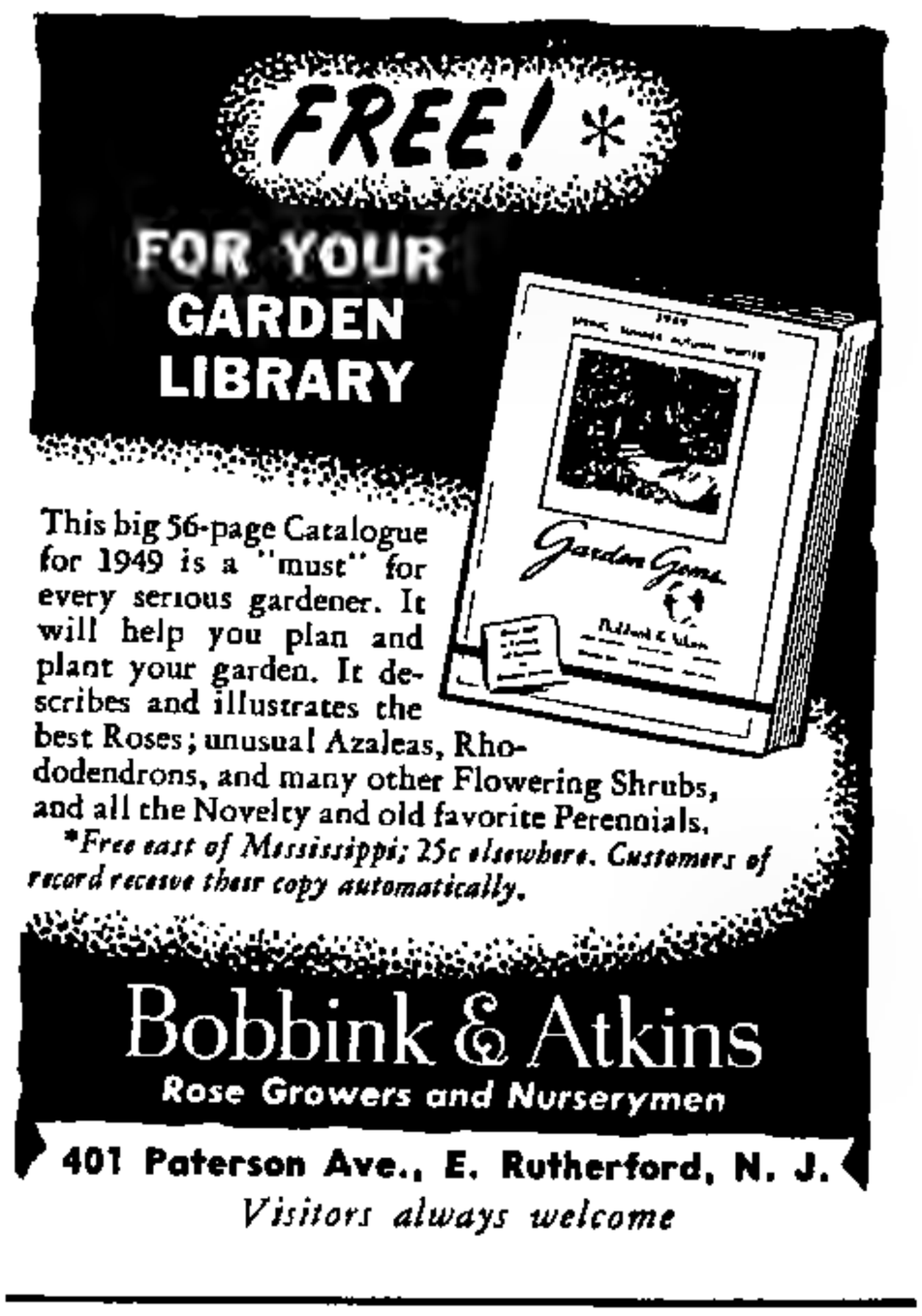
Ruth Gannett has added lithographs of unusual artistry to this volume, work that could easily make her a botanical illustrator of note. The book discusses the events and happenings at Cream Hill from 1762 to the present day, the interests and deeds of the people in the country, their marriages, house building, gardening, cooking, schooling and local government; it includes truly Thoreauvian observations, with authoritative digressions on the now-past poisonous reputation of the tomato, or man's changing vanities in regard to his facial hirsuteness, and even on pumpkin-pimping (a city phenomenon, of course).

Lewis Gannett shows himself a botanist of no mean ability, albeit he himself would directly disclaim the fact. His flawless knowledge of plants, their behavior and their histories, linked with a style the equal of our accepted nature writers, are accomplishments seldom combined and well worthy of finding expression in publications of the future.

It is as a contribution to local northeastern horticulture that this volume is a requisite to those who take delight in changing the plant cover of their own few acres. The Gannetts dove into the soil of Cream Hill with that spontaneity and enthusiasm that comes from healthy appetites and interests, and due respect but not reverence for the erudite and learned phytologic professionals. As a result they come up grinning with a wealth of horticultural information — of what plants can be left to themselves and where, and what plants cannot be left — of when to give your dinner guests milkweed shoots, called asparagus while being eaten.

The Gannetts have at all times worked along with Nature, not forced her full frame into gaiters and girdles. For this co-operation they have reaped a harvest of flowers, food and fun, the story of which can benefit all of us who strive for similar ideals.

FRANK E. EGLER,
Aton Forest, Norfolk, Conn.



The Charm of Fabre

THE INSECT WORLD OF J. HENRI FABRE. Edited with an introduction and notes by Edwin Way Teale. 333 pages, index, and photographic end papers. Dodd, Mead & Co., New York, 1949. $3.50.

Edwin Way Teale has given us in one attractive volume many of the finest passages from the massive, translated writings of J. Henri Fabre, that most eloquent French recorder of the lives of insects. Fabre enthusiasts will quibble over the choice of excerpts, but then, they could hardly be satisfied with so much less than the whole. The average reader will be obliged to the editor for his excellent discrimination and for the explanatory notes which precede each selec-

tion. Fabre's writings, of course, aside from their purely literary aspects, do require some interpretation for the modern discerning reader.

In a beautifully written introduction, Mr. Teale pictures Fabre's life and analyzes justly and with kindness his significance as a natural historian. A tasteful grouping of fourteen fine photographs adorns the end papers.

RALPH B. SWAIN.

Essential, Universal Crop

THE COMING AGE OF WOOD. Egon Glesinger. 279 pages, indexed. Illustrations by Henry Billings. Simon & Schuster, New York. 1949. $3.50.

This is a readable, optimistic, but not fantastic book on the forest situation of the world and its possibilities.

Though to some the title may sound as anachronistic as "The Coming Age of the Horse," the author points out that while many of this world's materials are headed toward the vanishing point, wood can be grown in never-ending quantities. Sooner or later, wood and its derivatives will have to replace in large part some of the non-renewable materials, including fuel, and supplement some of the annual crops of fibers and foods. Even now many nations could benefit by such substitutions.

Wood is a universal material which can be grown in any country, although not necessarily in adequate quantities. It will grow on much of the land not fit for agriculture and with less labor per unit weight than most agricultural crops; and it can be used in its natural state or in a highly modified condition.

With an adequate world supply of timber and all its by-products and the know-how of preparing and using them, want and low standards of living can largely be eliminated and one of the main causes of war averted.

These things, however, will not come of themselves. Dr. Glesinger says, "This calls for a world policy that does not wait for progress to happen but sets definite goals and then organizes action to achieve such goals." The lines of action recommended are: large-scale utilization of existing virgin forests, especially in the tropics, reforestation of denuded lands, public regulation of forest practices on private lands, research, and integration of industries so as to make practical the manufacture of useful goods from waste wood.

Dr. Glesinger, who was born in Czechoslovakia but now resides in the United States, is Chief of the Forest Products Branch of the Food and Agriculture Organization of the United Nations.

ARTHUR KOEHLER,
Consulting Wood Technologist.

Calendars for 1950

"The Flower Arrangement Calendar" compiled by Helen Van Pelt Wilson and published by M. Barrows & Co. contains a flower arrangement and a quotation — generally poetry — for every week in the year. The booklet, with spiral binding, measures 6½ by 8 inches and contains a 1951 calendar at the back. ($1)

Similar in style and size, "Flowers of America," the 1950 calendar issued for Christmas by Hastings House, contains a garden scene or flower portrait on each of the 52 pages facing the weeks of the year. ($1.25)

BOOKS OF THE SOUTH SEAS

NATURALIST'S SOUTH PACIFIC EXPEDITION: FIJI

Narrative account of native customs, flying foxes, cannibalism, burying alive of chiefs, widow strangling, interesting flowers, and present social conditions. 312 pages, illustrated with 166 photos..... $5.00

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A book of human interest describing the culture of the ancient Hawaiians, also the sugar and pineapple industries, as well as plants. Paper cover, 333 pages. 101 full-page plates, 39 figures $2.50

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Order direct from Author, Otto Degener, Box 187, Waialua, Oahu, T. H., or from New York Botanical Garden, Bronx Park, New York 58, N. Y.

Books for Students

LABORATORY & FIELD EXERCISES IN BOTANY. Fred W. Emerson & Lora Mangum Shields. 303 pages, illustrations, bibliography. Blakiston Co., Philadelphia, Pa. 1949. $2.50.

A week-by-week schedule of preparations such as planting seeds for a later lesson in growth and responses, a list of supplies needed for the course, and the names and addresses of botanical supply houses, make this book as useful to the instructor as to the student. In fact the introduction is addressed wholly to the teacher, who is told what his procedure should be to excite the interest of the student in the course. Both authors teach at New Mexico Highlands University.

LABORATORY PROBLEMS IN PLANT SCIENCE. George B. Cummins and others. 112 pages, illustrated. Burgess Publ. Co. Minneapolis, Minn. 1948. $2.

A practical point of view is maintained in this book through its emphasis on plants of economic use, their classification, structure, and diseases, and on weeds. Descriptions and floral diagrams are given for 40 families.

The authors are all in the department of agricultural botany at Purdue.

STUDIES IN PLANT LIFE. H. E. Stork. 115 pages, illustrations, glossary. Burgess Publ. Co. Minneapolis, Minn. 2nd edition, 1949. $3.

The philosophical point of view of one who comprehends far more than the daily lesson in botany is evident in this volume from the introduction on. Without the time to survey every page of this (or of many other books), it is trusted and assumed that the typographical omission on page 52 is not characteristic. As the line stands: "The cultivated grass blades of wheat produced over 862,000,000 bushels of oats . . ." Carleton College at Northfield, Minn., where the author is professor of botany, should produce a crop of enthusiastic botanists from the students who have been nurtured on this book.

LABORATORY EXERCISES IN HORTICULTURE. James A. Foret, and others. 121 pages, illustrated. Iowa State College Press, Ames, Iowa. 1949. $2.25.

From Iowa State College comes a book for beginning students in the cultivation of plants. Charts and blank spaces provide room for the answering of questions and the working out of problems in the book itself.

ELEMENTARY PLANT PHYSIOLOGY. Stuart Dunn. 164 pages, illustrated, indexed. Addison-Wesley Press, Cambridge, Mass. 1949. $3.50. A **LABORATORY MANUAL** to accompany the text — $1.

Essential principles of the chemistry and physics of green plants are given in nine chapters, which cover, after a brief introduction to this branch of botany, the subjects of the structure and function of the plant cell, absorption, transpiration and translocation, mineral nutrition, photosynthesis, organic constituents of plants, respiration, and growth and movement. The text has been laid out for a one-term course. It is accompanied by a laboratory manual offset on 8½ x 11 inch sheets which are punched for a standard student's notebook.

Richness of Foliage

TREES OF SANTA BARBARA. Maunsell Van Rensselaer. 213 pages, illustrated, indexed. Santa Barbara Botanic Garden and The City of Santa Barbara Board of Park Commissioners. Revised and enlarged edition, 1948. $2.25.

This new edition of the outstanding book by Maunsell Van Rensselaer, Director of the Santa Barbara Botanic Garden, is a fascinating survey of the kinds of trees growing in the Santa Barbara area. The assemblage is probably unique on this continent, and this book might well be the model for similar surveys of the trees of hundreds of cities and counties in this country. Among its many valuable features are the notes on and location of outstanding specimens. Excellent illustrations add much to the book.

Anyone driving through Santa Barbara on the coastal highway must be impressed with the unique Moreton Bay fig at the very edge of the route and with the magnificent araucarias dominating the town. The more leisurely student finds tree treasure of great richness. There are exotic palms at the famous Gillespie gardens in Montecito, the largest *Taiwania* in this country gracing Hillside Park, and the two delicate *Conzattia* trees introduced by Dr. Franceschi many years ago. The book lists many more, making a total of 745 kinds of ornamental trees now growing within 50 miles of Santa Barbara, and more than 1,000 characteristic or noteworthy specimens are cited.

B. C. BLACKBURN,
Gladstone, N. J.

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Plants for shaded gardens, mentioned in the series of three articles by Frances R. Williams, are indexed on pages 201-202.
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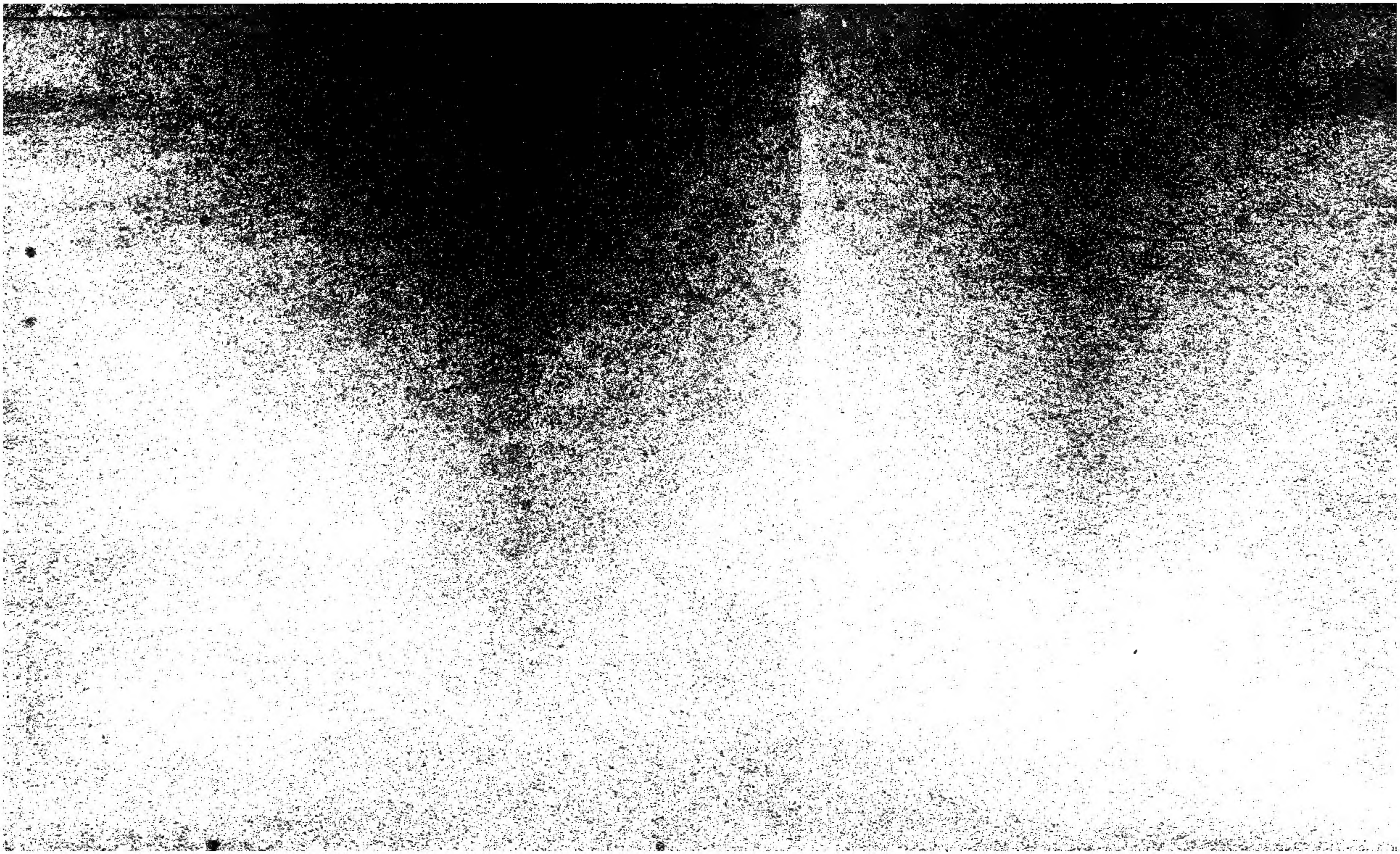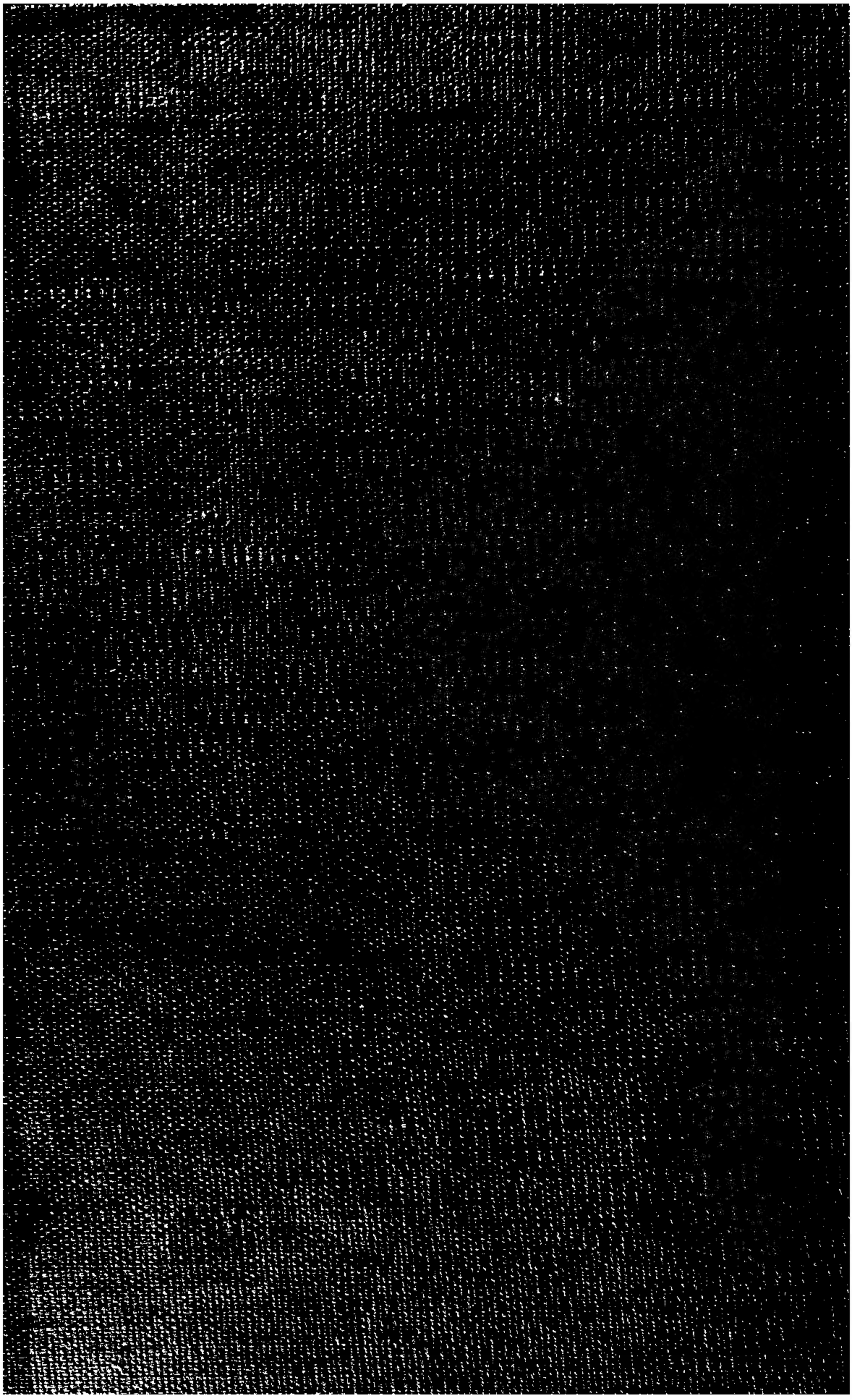
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